NAVY MEDICAL CARE STUDY
COSTS AND ECONOMIC EFFICIENCY

Phase I

BY

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DECEMBER 1973

THE CONSULTING DIVISION
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THIS WORK WAS CONDUCTED FOR THE
OFFICE OF NAVAL RESEARCH UNDER OUR
CONTRACT NUMBER N0014-73-C-0341
AND OUR CONTRACT AUTHORITY
IDENTIFICATION NUMBER NR Q462-57.

NOT PRINTED AT GOVERNMENT EXPENSE.

SECOND PRINTING

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Unclassified

Security Classification

DOCUMENT CONTROL DATA - R&D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified).

1. ORIGINATING ACTIVITY (Corporate author)
The Consulting Division, Boeing Computer Services
505 Baker Blvd.
Seattle, Washington 98188

2a. REPORT SECURITY CLASSIFICATION
Unclassified

2b. GROUP
---

3. REPORT TITLE
Navy Medical Care Study: Costs and Economic Efficiency

4. DESCRIPTIVE NOTES (Types of report and inclusive dates)

5. AUTHORS (First name, middle initial, last name)
Robt. D. Lamson
John J. Waggoner
Dale E. Minner, MD

6. REPORT DATE
December 1973

7a. TOTAL NO. OF PAGES

7b. NO. OF REFS
--

8a. CONTRACT OR GRANT NO.

b. N0014-73-C-0341

c. NRQ462-57

d.

9a. ORIGINATOR'S REPORT NUMBERS

9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)
---

10. DISTRIBUTION STATEMENT
Distribution of this document is unlimited

11. SUPPLEMENTARY NOTES

12. SPONSORING MILITARY ACTIVITY
Office of Naval Research

13. ABSTRACT

The resource costs of the inputs to the delivery of Navy medicine are presented in some detail and examined. The outputs are similarly reviewed. Such indicators as admissions, occupied bed days, and outpatient visits are analyzed and modified to make them comparable to similar indicators in the civilian sector. Finally, the incentives of the delivery of medical care as reflected in the rates of utilization of both inpatient and outpatient services are analyzed. The effects of different prices to the consumers and different budgetary methods are considered to better understand these differing rates of utilization. The effects of fully costing the resources, of using more adequate output measures, and changing the incentives of the system are discussed.

FORM
DD 1 NOV 65 1473
U3 4201 1030 REV 7/70
PART 1 OF 3

Unclassified

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Military Medicine						
Navy Medicine						
Economic Analysis						
Efficiency						
Budgeting						
Cost Analysis						
Health Maintenance Organizations						

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Of course, DOD has studied the problem, attempting to determine how they could provide the same care with fewer physicians. The DOD/HEW study *Reducing the Needs for Military Medical Personnel in the Armed Forces* [7] did conclude that some increased utilization could be effected although, as neither HEW nor DOD believed that military medicine had been grossly inefficient in the past, these increases would not be substantial. The *Medical and Dental Officers Billet Requirement Study* [2] found that some reduction in medical corps billets could occur through substitution of other personnel, reduced staffing, and/or realignment. This is what one would expect to happen due to the change in the vector of prices for the resource inputs facing the military. But we should recognize that the military will be competing for the health care professional not only in wages but also in working conditions. The Navy doctors already work about as many hours a week and see as many patients as do their civilian counterparts. Certainly from our site visits, we found little evidence of physicians not working hard or doing a poor job. Therefore, upon considering the constraints of the competitive market as well as previous studies' findings, one should not anticipate large savings from increased utilization of the health care professionals.

Another suggestion has been to reduce costs through a tri-service medical corps rather than the Army, Navy, and Air Force each having its own Bureau of Medicine and Surgery. Here too the potential savings are limited. The argument for savings must rest upon economies of scale. The services are already sharing their health care facilities, especially in those regions where the individual and even the combined services beneficiaries' demand is relatively small. There are cases where large Navy, Air Force, and Army hospitals are located at close proximity, but the economies resulting from combining them would not be large. Finally, two of the three administrative heads of the medical services could not be eliminated without significantly enlarging the third. In brief, while small gains may be made, this will not satisfactorily solve the problem of Armed Forces health care.

Another alternative would be to rely more heavily on the civilian sector to care for some segments of the beneficiary population. The primary civilian alternative is the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). There are some restrictions on its use, especially for inpatient care for the dependents of the active duty population. However, the program has grown significantly in the past and is projected to grow even more rapidly. The counterargument to using the civilian sector is that the military can provide similar services at a lower cost. The DOD/HEW study [7] reported that the cost for an inpatient day in a Navy medical facility in FY 1971 was $52.63. The comparable price to the government for CHAMPUS was $85.43 for that same year. However, under CHAMPUS, patients paid a part of the costs due to the co-insurance provision for inpatient care. Without this copayment feature, the cost to the government would have been more then $100 per day. HEW did indicate that comparable services might not be offered by the military hospitals and CHAMPUS and, in any case, that capital was not properly accounted for and the AVF vector of prices had not been used to price military resource inputs. In the first two quarters of FY 1973, the Bureau of Medicine and Surgery's Expense Operating Budget (EOB) reported the cost of an inpatient day in Navy medical facilities to be $74 and the cost of an outpatient visit to be $8. Both of these rates are significantly lower than the government's share of the CHAMPUS prices for either inpatient or outpatient services. Of course, if these prices do reflect the true resource cost to the government, then CHAMPUS is a feasible alternative, although an expensive one.

Additionally, these average costs may not be good indicators of the changes in costs that the government would experience if the source of care were transferred from military medical facilities to CHAMPUS. While we may be able to assume that the price of CHAMPUS care would not rise even with increased demand, we certainly cannot assume that the average cost of providing care in the military facilities is equal to the marginal costs. The argument has long been made that the incremental costs of caring for segments of the civilian beneficiary population is low given the constraint that the active duty population must be served. Often only the short-run considerations have been taken into account and adjustment has not been allowed for changes in the scale of operation of inpatient and outpatient services. However, the objection is valid that, in calculations of changes in costs, marginal costs must be used rather than average cost.

If we anticipate the financial impact of the proposed $15,000-a-year physician bonus, we would expect that this alone would increase the unit cost reported for military hospitals by at least 10 percent. If bonuses in excess of $15,000 were required to recruit adequate numbers of physicians, the unit cost would increase proportionately with the bonus. It would appear that this adjustment alone would not be enough to significantly alter the view that CHAMPUS is a relatively expensive source of medical services. However, there are other deficiencies in the EOB reporting system that would result in a low estimate of the true cost to provide medical services through military facilities. Some of these were alluded to by HEW [7]. The cost of capital has not been adequately allocated as an operating expense. The general procedure that should be followed here is to amortize the acquisition cost of capital over its useful life including not only the required amounts of depreciation but also those dollars required for an implicit interest expense. Additionally, all the costs of labor should be allocated to the measures of final output that are used even if the immediate product may be only an intermediate good such as training, professional development, or even procurement. Finally, HEW's argument that the medical care provided in military facilities is different from that available in the civilian sector has general validity. An adjustment to derive the cost of comparable care must be made by identifying new output measures in lieu of the cost per occupied bed day.

But there is an additional problem that has not been dealt with adequately—the incentives embodied in the method of delivery of medical care. In *Health Services in an All-Volunteer Force* [14] Mordechai Lando observed that, while one would expect the active duty population to be healthier than the civilian population generally (this is one of the criteria for screening inductees), the active duty population experiences markedly higher rates of utilization of medical care than do their civilian counterparts both in terms of admission rate and length of stay once admitted. The active duty population also consumes outpatient services much more frequently. When properly interpreted this is the implication of the parallel Center of Naval Analysis (CNA) and BuMed physician requirements studies [2]. The CNA study indicated that the physician population ratios were much higher for the Navy population than they were for the Kaiser-Permanente Health Care Plan population, even after adjustments for geographic distribution, demographic characteristics, and mission constraints. The BuMed study indicated that there was ample justification for the number of physicians based on workload data. The resolution of this apparent conflict is the much higher rates of consumption of medical services by the Navy beneficiaries than by the Kaiser-Permanente health plan members. The extent to which this is justified by mission constraints and administrative processing is difficult to determine. However, a cursory view is not adequate to completely discount the importance of the incentives of both the providers and the consumers of the medical services.

1.2 Approach

The two previous paragraphs have implicitly disclosed our approach to the problem. We have tried to develop a better understanding of the production process and incentives facing both the providers and consumers of medical care. Of course, the first part of the problem is a more complete specification of the input and output measures used to evaluate the activity of Navy medicine. The resource costs of the inputs are presented in some detail in the Navy medical support Five Year Defense Plan (FYDP) as well as the Expense Operating Budget reports generated at the Bethesda Medical Data Center. We examined these reports, determined some deficiencies and made some adjustments to them. The outputs are similarly reported for each medical activity to the Bethesda Medical Data Center. Such indicators as admissions, occupied bed days, and outpatient visits are reported as well as some measures indicating the ancillary services and the type of care available. We also examined these and made some modification to make them comparable to similar indicators in the civilian sector. Finally, the incentives of the delivery of medical care are generally reflected in the rates of utilization of both inpatient and outpatient services. We considered the effects of different prices to the consumers and different budgetary methods to better understand these differing rates of utilization. Finally, we simultaneously analyzed the effects of fully costing the resources, of using more adequate output measures, and changing the incentives of the system. The results of this analysis are discussed in Chapter 5.

It should be pointed out that we did not explicitly consider the mission requirements in the military sector. The military medical facilities must be able to provide care not only for a geographically unstable population but also to meet certain contingencies that would imply a surge in the demand for medical care. This is one of the products that they produce, but it is extremely difficult to quantify and to allocate any of the reported expenses to this output measure. Our analysis will only be peripheral to this point. It must be so unless we were to consider different methods of holding inventory of required resources such as in the reserves, both active and inactive, or perhaps in legislation providing for an emergency doctor draft. However, this does not mean that what we provide will be of no use when considering the constraints imposed by the mission.

Some of the scenarios we have considered do involve reducing the scale of operations of the medical facilities by requiring segments of the civilian beneficiary population to receive all their medical care through CHAMPUS. Some of these scenarios would involve cost reductions to the government. However, they also imply that there would be a smaller inventory should there be a surge in demand by the active duty population. This results because, if large segments of the nonmilitary beneficiary population are being served, then they could be cared for by the civilian sector in the event of an emergency. BuMed could then provide more care to the active duty population. These are trade-offs that we have not quantified but have implicitly costed.

Policy makers will have to consider whether this trade-off is worth the reduction of inventory which it implies. The mission does not provide an absolute constraint. Rather one should consider what one can accomplish and also what it will cost. The less it costs to hold this inventory of medical resources, the larger the inventory one should have and vice-versa. In essence, constraints should be based on cost-benefit analysis as are other decisions.

1.3 Overview

Our analysis is presented in the following manner. First we set the scene by describing how medical care is delivered in the Navy and make some comparisons with other types of medical care delivery systems. This descriptive chapter, Chapter 2, also discusses some aspects of both the quality and efficiency of current practices based on site visits by the study team, along with some recommendations for improvement. Chapter 3 outlines the theoretical approach on which our cost estimates and analyses are based. Chapter 4 discusses in detail the data and the adjustments to the data used in the cost equations. The results of the cost model are listed in Chapter 5, and in Chapter 6 they are used as a basis for the discussion of policy implications and our conclusions. Detailed support material is included in the appendices.

2.0 DELIVERY OF MEDICAL CARE IN THE U.S. NAVY

Most of the material presented here is based on observations drawn from site visits in the San Diego, Portsmouth, and Bremerton Naval Medical Regions. Although some portions of this chapter may read somewhat like an inspection report, criticism is not our intent. The intent is rather to gain a first-hand understanding of system operation in sufficient depth to develop methods of costing the system, to estimate the accuracy and meaning of previously reported aggregated activity data, to understand economic and other incentives present in the system, and to develop the understanding necessary to estimate the effects of system changes that might be suggested by strictly economic analysis.

Section 2.1 is an overview of the Navy medical care system with descriptions of features which affect cost, incentives, and demand for medical services. The fundamental difference between Navy medicine and other systems—the direct support of military preparedness—is also discussed.

Section 2.2 presents elements of other medical care delivery systems to clarify the unique characteristics of the Navy system and to serve as background for the discussion of the economic consequences of either shifting care to these systems or of making changes in the Navy system to make it similar.

Section 2.3 presents lists of observations from the site visits which impact upon technical efficiency. Some additional observations are made regarding the quality of the medical care provided.

2.1 The Current Delivery Structure

Navy medical care consists of two overlapping systems which can best be understood by their organization prior to "regionalization." These two systems can be called the "hospital" and the "fleet" systems.

The fleet system was organized to serve the medical and medical-administrative needs of the line Navy such as processing of applicants, outpatient care of uniformed personnel and some dependents, and retired personnel in areas remote from alternative sources of medical care. The system also provided special medical-biotechnical support: aviation medicine, diving medicine, submarine medicine, and other life-support functions. While primary assignment of medical personnel was by BuMed, they were under the direct control of local line command and thus were directly responsive to its needs and competed with nonmedical areas for budget and other support.

The hospital system consisted of the Naval hospitals, outpatient departments, and associated support functions. These hospitals were originally intended to supply primary medical support of uniformed military personnel with medical care provided "as available" to dependents and to retired personnel. The hospital system was (and is) under the command and control of the Bureau of Medicine and Surgery. Some local support, including some transportation, security, and maintenance, was furnished by nonmedical organizations.

The Navy is now undergoing regionalization—an attempt to bring all medical functions under the control of BuMed to increase the overall control. This is intended to increase integration of the two systems, foster sharing of common support, increase visibility of medical cost and control, and increase the ability of the Surgeon General to set priorities for the medical service as a whole.

A Navy Medical Region is a self-contained interdependent organization for dispensing medical services. Its elements include sick-call referral facilities, dispensaries, hospitals, and medical centers, i.e., hospitals with attached teaching facilities. This organization of Navy-controlled resources, combined with CHAMPUS, is the source of care for the beneficiary population.

There is at least one hospital or medical center within each region. These are supported by branch dispensaries and sick-call facilities. All have certain inputs in common: manpower, supplies, utilities and rent, equipment, and purchased services. Additionally, the hospitals perform certain adjunct services for patients treated in branch dispensaries. The dispensary can accommodate outpatient visits and inpatients for duration of up to 72 hours in theory although, in fact, some provide much longer care. Thereafter the patient must be transferred to the hospital. Sick-call facilities perform a screening function for active duty members. Administrative control of this health care network resides in the regional medical centers. Sub-regions also exist when there is more than one hospital in a region. Their organization duplicates the regions, with the sub-region's hospital reporting to the regional medical center.

Two different medical objectives are implicit in the Navy medical system:

1. Direct medical, medical-administrative, and military medical speciality support to the combat-ready Navy. This requires a responsive, flexible, mobile force of medical personnel, highly proficient in special medical areas and skills significantly different from those attendent to other medical care systems.

2. Medical support of dependents, retired, and dependents of retired personnel. This helps encourage the enlistment and retention of uniformed personnel and, it has been suggested, provides clinical opportunities to attract and retain physicians and other professional medical personnel.

It is important to note that, while the majority of activity is connected with dependent and other clinical care, medical support of the military mission and force planning is the unique and irreplaceable minimum of service-specific medical care.

Aside from its primary role in support of combat readiness the Navy medical system can be characterized as a "prepaid comprehensive medical care plan" with the following unique features:

1. The cost of the premium is invisible to the consumer and has been underestimated by the provider (see Chapters 4 and 5).

2. It is not strictly financed by capitation funding, but by periodic budget review and justification on the basis of previous activity.

3. It has an "escape" or "overflow" feature—the payment to providers outside of the plan when personnel and/or facilities are not available within it—through CHAMPUS.

4. The plan is not controlled, in any direct sense, by the providers or the consumers, does not generate funds directly by the provision of services, and thus has no incentive for either increased productivity or for cost containment.

5. Demand is controlled largely by the queue of patients awaiting attention or the general convenience or inconvenience of obtaining medical services. Because care is nearly costless to active duty personnel (no charge and unlimited sick leave) there is a large demand for treatment of trivial "sniffle" complaints.

6. Financing by long leadtime and invisible premiums paid only by service time generates much care delivery that is far removed in time from the "payment period."

7. The physician practitioners (providers) employed by this plan have an administrative relationship that is substantially different from that of almost all other physicians—they are controlled by command authority. While in some situations they command and control subordinates, in general they have little control of their own practice situations.

8. All the providers and many of the consumers are frequently moved from one location to another, making long-range practice planning difficult.

9. The success of the provider is rewarded by fulfilling the expectations of superiors and is not directly related to the provider's ability to attract and retain a following of patients.

10. The system uses uniformed personnel who are frequently unavailable for the provision of primary care due to frequent personnel reassignment, liberal leave policies, and other military duty.

2.2 Structure of Other Medical Care Delivery Systems

1. Health Maintenance Organizations and Prepaid Capitation Plans

These plans are financed by a premium or fee paid by each person covered (capitation) on an actuarial basis and in competition with other systems. This fee or price is set to appear low in comparison with some of the cost risks of illness but can be expected to generate sufficient revenue to cover the total cost of health care delivery and provide some additional funds to distribute as productivity and cost-containment incentives.

The medical services are provided by both general practitioners and specialists who are stable in location and who advance either by increased salary or by professional recognition and not necessarily by promotion to a different job or set of tasks. The practitioners usually have productivity and cost-containment incentives through formulae which distribute a portion of

the difference between the revenues received and the cost of the services provided. In addition extra wages may be paid for extended hours of duty or extra duty in, say "the emergency department." Cost containment in this situation is handled by:

a. Reduction of the number of elective procedures

b. Reduction of hospitalization to the minimum possible length of stay

c. Assumption of some care by paramedical practitioners who have a stable, supervised relationship with physicians

d. Internal education efforts to maximize physician efficiency and to minimize unnecessary and costly laboratory and x-ray procedures and consultations

e. Studied attention to maximum flow efficiency including appointment methods

f. Substitution of outpatient, home, and convalescent care for acute in-hospital care

g. Fostering patient continuity to avoid replication of data gathering and recording and to increase patient education

The smaller plans also have an escape or overflow mechanism: the referral to specialists having skills needed only occasionally where the fees are paid by the plan.

While an appropriate amount of time is allowed for vacation and for training, the lack of personnel dislocation, sea and overseas duty make personnel available almost all of the time. Another interesting feature of the Health Maintenance Organization is the absence of the need to focus on defined tasks for the recovery of revenue—this allows flexibility in the use of innovative substitution without economic disincentive and avoids the dependence on "high-fee" surgery and other high-fee procedures which can and probably do bias judgement.

An important potential problem area in this system is the strong economic bias for cost containment. This bias may foster actual underutilization, including nonhospitalization of problems where hospitalization is clearly indicated (acute eppligottis, history of amnesia and unconsciousness following head injury, undiagnosed chest pain suggestive of myocardial infarction, etc.). And, of course, the HMO system does not provide the flexible response necessary to support military operation.

2. The Profit and Not-for-Profit Hospital System—Private Medical Practice

The majority of civilian medical care in this country is delivered, under a combination of "free-market" mechanisms and fee-for-service insurance reimbursement plans, by physicians in private practice in cooperation with profit and not-for-profit hospitals.

The operational incentives of these two types of hospitals are the same: the maximization of revenue by increased activity and the maximum recovery of fees for each service rendered. There is little difference, in most instances, between the relationship of the professional medical staff in either type of hospital. This relationship is unique from all other business and professional relationships. The medical staff members are neither employees of the hospital nor in charge of it. They work in a symbiotic relationship with it. Some physicians, especially pathologists, radiologists, anesthesiologists, and some physicians who practice emergency medicine may have contractual relationships with the hospital but, even then, all physicians are essentially in the business of selling services.

The physician sees those patients who expect the type of service that he is trained for and willing to render, and a charge is made to the patient or to his insurance carrier that is identified with a specific and identifiable task.

Both the physician and the patient are in contact in a circumstance where they are stable in location and where the physician is in direct and immediate charge of all business and personnel aspects of his own practice. The success of a physician is achieved by gaining the confidence and patronage of patients willing to come to him, and by gaining the confidence of his peers so that they are willing to refer patients and engage in cooperative efforts.

Actual payment comes from a variety of insurance and private mechanisms and may involve several different fee schedules: one for welfare patients, one for Workmen's Compensation cases, another for Blue Cross/Blue Shield, still another from CHAMPUS, etc. Each of these plans offers payment through different mechanisms, tending to make fee-for-service collections a relatively high-overhead operation.

Depending on the type of practice or speciality, the physician usually has "hospital privileges," meaning that he can make the decision to hospitalize, and then treat the patient in the hospital and collect additional fees for such service.

The ability to pay through one of the payment mechanisms usually entitles a person to receive care. However, some physicians will not take CHAMPUS, others not welfare, still others are not members of Blue Shield, and some may not take Workmen's Compensation cases.

The Navy, and other uniformed services, care for a large portion of their personnel in this manner through the CHAMPUS system. Potential strengths and advantages of this system include:

a. Free patient and doctor choice of one another

b. Good doctor-patient service continuity

c. Locational stability of the provider and the consumer

d. Strong productivity incentive that assumes that the provider will be active almost all of the time

e. Distribution of care provided by economic mechanisms

f. Physician control of own business affords ability to rapidly change practice patterns, equipment, furnishings, patterns, etc.

g. Strikes and cooperative organization are not likely

Potential dangers and disadvantages of this system:

a. Strong economic incentives towards unnecessary or excessive tasks and towards the performance of the tasks with higher fee rates (i.e., elective surgery)

b. Inasmuch as distribution is by economic incentive, it fosters lack of care in areas of a weak economy (ghettos, rural areas with low population density)

c. No natural incentives towards continuing education and improvement of practice, along with weak quality control standards—those quality control activities attempted are *ad hoc* and are not self-correcting.

3. Nonmilitary Government Hospital Systems

While the consultants are reluctant to lump this collection of mechanisms into a single category, some generalizations can be made. Examples of this system include some portions of the U.S. Public Health Service, the Veteran's Administration, and various state mental hospitals.

These systems are financed and operated in response to a need for medical care that, for some reason or reasons, cannot or should not be provided by other systems. These reasons have included the lack of a sufficient economic base and, thus, the lack of providers; for example, the lack of a cash economy in some Indian reservations along with the coexistent obligation of the federal government to provide care, the need for special communicable disease control, the ability to provide care for foreign merchant mariners, and the need for long-term financial support for the hospitalization of citizens with mental disease.

These systems were financed and initially implemented by political decision in response to public awareness of a problem. Unfortunately, many times the public considers a problem solved when the initial decision is made and the new system is left to compete for public awareness before there can be any significant redirection, i.e., public control has been insufficient.

Government hospital systems depend on salaried providers frequently hired below the market wage for the private sector and, therefore, have had to depend on individuals who elect to be employed as an alternative to the draft, who hope to gain some special training at low cost and at higher stipend than available through the private sector, or those who may be marginally qualified to compete in the open market: foreign graduates who are still learning American English, practitioners without state-specific licensure, and individuals who function best in well defined and inflexible circumstances.

It has been postulated that when individuals are employed below the wage scale for equivalent service elsewhere, especially if they consider the work administratively inflexible and otherwise unpleasant, they will demand and achieve unusual employment security and other compensation such as an implied contract "not to work too hard."

These systems have only two mechanisms to control consumer demand: long waiting lines and other unpleasant circumstances that substitute for "marginal cost" of service, and truncation of service (when the hospital is full no more patients are taken). Only if these mechanisms provoke general public awareness will resources be increased or significantly redirected.

Advantages of government hospital systems:

a. Able to fill a special need under special circumstances which cannot be filled by other systems

b. Ability to distribute unbearable costs to the general population by taxation, as in medical costs for mental hospitalization

Problems and disadvantages of government hospital systems:

a. Inflexible to change because redirection and changes in funding are the results of *ad hoc* political decision

b. Unresponsive to market considerations, not self-correcting

c. Entitlement and mission of each system is limited by rules which encourage gaps and duplications in service to the general population

d. Tendency to foster such misincentives as the implied contract not to work very hard, and employment of marginally qualified professionals when wages lag behind inflation due to problems (a) and (b) above

e. Indirect dependence on military draft obligation

f. Inadequate and unpleasant demand control without productivity incentives

2.3 Observations: Effective Efficiency and Quality of Medical Care in the Navy

The goals of the study, and more specifically of the site visits, were to gain a firsthand understanding of the present functioning system to spot items and activities that might affect its costs; to gain information that would help to understand the meaning of previously reported and published information; to understand economic and other incentives present in the system; and to furnish knowledge useful in anticipating the effects of system changes.

We sought to do this through the "management audit" technique, which first seeks to determine the overview of top management and then observes the system functioning at its lowest levels. This enables us to detect differences between the purposes and goals of each level and to gain a real understanding of the system structure and workflow. This actual observation of day-to-day events revealed a number of conditions that may adversely affect the efficiency of care delivery and the quality of the care provided.

The assessment of medical quality, especially clinical outcome, was not a goal of the study and could be considered beyond the scope of this report. Some observations which are relevant to considerations of quality were, however, made and are presented in the hope that they may be useful. Note that the list of items directly bearing on quality *per se* is short and the items are in no way unique either in character or in frequency to the Navy. In fact, it is accurate to say that at no time did the consulting team uncover findings that would indicate that the technical quality of the final delivered care is significantly different from that delivered by most other medical care systems. One can speculate, in fact, that the quality of the delivery care is more a function of the training, selection, and dedication of the health professionals.

2.3.1 Observations Impacting Efficiency

There is a frequent assignment of the youngest, least experienced, and least influential physicians to the most difficult and sensitive tasks: the rapid acquisition of initial information with accurate and timely triage. The first contact, especially in high-volume delivery areas, is currently held in low regard and is viewed as distasteful by those eager to be promoted to more specialized, prestigious, and less difficult tasks.

There are serious deficiencies in medical facilities with regard to space layout and workflow patterns. It was common for physicians to have only a single room in which to work -a combination office and examination room rather than the three to six examination room areas used by almost all physicians in other systems (except government hospital systems).

Poor physical facility layout also has resulted from use of older facilities that were designed to accommodate the earlier practice patterns and that were constructed with permanent weight-bearing walls that limit the opportunity to remodel. An example of facility problems with "brick and mortar" is found at the Portsmouth Naval Hospital. This hospital was constructed with a fixed service tower so that the patient beds, located in side wings off of this tower, could be expanded through less expensive construction. That is, the service tower was designed to heat, cool, and supply electrical power and elevators for 1300 beds. The services provided by that service tower are now saturated at approximately 900 beds due to the change in practice pattern from support of uniformed inpatients to the support of a large outpatient population, with the resultant need to move large numbers of outpatients up and down to the lab and the radiology deparments.

Most Navy hospitals have large open wards which make the disposition and distribution of patients difficult. They now consist of women and children and this, along with an increasing trend to specialization, makes assignment of patients service-specific. It is obvious that an excessive number of beds is maintained when compared to the number necessary for proper assignment using smaller wards or private rooms.

Except for isolated instances (Seattle Naval Dispensary, Miramar) there is little physician continuity in primary outpatient care. This lack of continuity is especially prevalent at San Diego where few patients, even those under active treatment of chronic conditions requiring trials of medications, are allowed appointments with specific physicians. This produces a situation where each physician is forced to read the entire record, frequently written in several different hands, and, frequently, is forced to recollect and record previously collected information.

The basic medical record for uniformed personnel, for outpatient purposes, is standard throughout the service and largely standard for all three major services. The hospital inpatient records and all records of the dependent and retired populationns vary from site to site in both format and disposition policy of the inactive medical records. This lack of uniformity induces extra and unnecessarily complex record management. Some attempts are being made to adopt a problem-oriented medical record in order to more explicitly describe the clinical situation of each patient and develop and briefly state the plans and goals of treatment for each problem.

Circumstances of practice are arranged so that frequently there is relatively little opportunity for the physician to directly supervise his assistants. These circumstances include the assignment of nurses and corpsmen to physicians on a rotation schedule. He thus has little opportunity to understand their personalities or skills and is limited in his ability to develop paraprofessional substitution of tasks. We found an almost total lack of paraprofessional task substitution in dependent care. In some areas attempts by corpsmen to handle simple common complaints represented little more than an additional waiting line and an additional stop prior to the examination by the physician.

Because the financial support of the medical institutions is justified by the reporting of activities, it is difficult to understand why the automatic data processing equipment appears so primitive and scarce. This equipment frequently consisted of either accounting machines or minimum-core batch machines operated at high personnel expense. There was also almost no evidence of inter-institutional cooperation in the development or sharing of this equipment.

There is a rather large accumulation of unused or underutilized, outdated expensive capital equipment—mostly radiological equipment—in all regions visited. There appears to be no economic advantage in disposing of this material.

Active duty inpatients are kept much longer than other individuals with equivalent conditions due to the condition of reassignment. This results in the provision of "convalescent" or "rehabilitation" care in the hospital that is not provided in other medical care systems. The presence of these almost-well patients provides the opportunity to count them as inpatients for activity credit, and to gain from their work without having to account for their pay. The widespread use of patient labor in the Navy hospitals probably results from this double incentive and leads to both an underestimation of labor costs, and an overestimation of inpatient service supplied.

There were certain other observations which may involve operational and technical inefficiencies: some scheduling of outpatient procedures after the admission of patients, appointment-back scheduling of radiographic procedures for inpatients, some handcopying of previously recorded

clinical laboratory data to the inpatient chart and, at Bremerton, some tendency to refer patients with significant illness to outside hospitals (Madigan)—illnesses that a hospital of Bremerton's size and type might frequently be expected to handle locally.

2.3.2 Quality of Navy Medical Care

It was not the intent of this study to determine the quality of medical care provided by the Navy; however, some observations are presented, both in the hope that they may be helpful to BuMed and to provide background for our discussions of demand for medical services.

Medicine is really a socioscientific discipline and can be regarded as producing two types of care with two different outcomes. We refer to these as Type I and Type II services. Type I care is composed of those actions that have a known physical or chemical effect to produce a favorable response such as the prevention of immediate death, elimination of disability, or control of the progression of a disease. Type II care can be said to consist of those actions that provide comfort, support and advice in situations that are threatening or are perceived as being threatening to the individual. Examples include most prescriptions for the common cold, counseling of the dying patient and his family, and counseling and reassurance of a hyperventilating patient. Note, however, that Type II care is almost *always* involved in medical practice as it is delivered with Type I care in order to obtain permission and cooperation, if nothing else.

The following observations are divided and presented as incidental observations which may, on further investigation, influence each of these two types of care.

Type I medical care related observations:

- The widespread use of the least experienced, least trained personnel in important and sensitive areas of emergency care and first patient contact.

- The incidence of lost or misplaced medical records that either delay treatment or result in treatment prescribed in ignorance of the case history.

- The delay of some medically indicated radiological procedures to a more convenient time to accommodate the system; such as the scheduling of female patients on Mondays. (This also may lengthen the length of stay unnecessarily.)

- The widespread use of insufficient, old, and outdated defibrillation equipment in emergency areas (at all sites visited).

- The occasionally observed use of the 100-ma radiographic machines for heavy dosage procedures such as pelvic and low-back x-rays, and the continued use of 100-ma technique in 300-ma machines.

- The widespread use of improper, outdated, and underequipped ambulances with crews not *immediately* available on site for instant response.

- Lack of physician-patient continuity, which may promote loss of previously collected information and increase communication difficulties.

Type II medical care related observations:

- Unpleasant and unnecessary patient waiting time induced by either the absence of appointment procedures or by the use of unpleasant (if efficient) techniques such as the assignment of "block appointments"; all morning patients, for example, given 8:00 a.m. appointments.

- The necessity for large numbers of waiting patients to observe the doctors standing in the hall waiting for patients to change in their only office/examination room (Portsmouth).

- The lack of physician/patient continuity which prevents the continuation of reports that may have been developed in a previous visit.

- The obvious "charity" atmosphere (San Diego, Oceana N.A.S.) characterized by long lines, hard benches, poor lighting, and hardness of the medical personnel born of hard work in difficult surroundings.

- An atmosphere and attitude system that is difficult to prevent where there is no apparent cost to the patient and no productivity incentive for the provider. (What is "successful practice" in one place becomes "over-utilization" in another.)

- The physician's ability to deliver Type II care can and probably is severely limited by the inefficient and drab surroundings which affect his attitude towards work.

Improvement in these Type II areas is important to quality when considered alone. However, one is tempted not to adjust some of these apparent deficiencies when cost effectiveness is being considered—at least not as long as they remain part of the only effective mechanism for the control of demand. In fact, it is probably accurate to say that if all factors of efficiency and quality were completely corrected, total costs would increase and become unacceptable due to uncontrolled demand. Therefore it is necessary to try to design system incentives that will encourage productivity and improved quality *while* controlling demand.

3.0 THE MODEL

In this chapter we present the conceptual considerations that provide the basis for the cost estimates and their implications which are discussed in later chapters. The theoretical framework is presented in two steps. First, we outline an idealized formal model based on the Navy Medical Regionalization Program that would provide either the minimum-cost mix of input resources for specified levels of health care delivered, or the maximum service delivered based on specified input resources (a constrained budget). Then, after a discussion of real-world constraints and our assumptions, we present a formal view of a bookkeeping cost-estimating procedure that permits us to address the important questions facing decision makers in a practical and meaningful fashion. The application of the cost-estimating model is discussed in detail in Chapter 4.

It must be emphasized that what follows is only a conceptual framework for our analysis and not an algorithm to be solved. The formal model was used as a guide in determining the question we explored and the data required. There is no attempt to "optimize" with this comprehensive model.

3.1 The Formal Model

Efficient provision of medical care for the Navy and Marine Corps beneficiary population can be viewed in the framework of a cost-minimization model subject to constraints implied by the level of services delivered and the production function. The services are those required by the population to assure a high standard of health. The production function indicates the required resource inputs to produce the service requirements. Identically, the dual of the problem can be formulated: that of maximizing medical service output subject to budgetary constraints. The latter formulation would be more appropriate for the increment-decrement CPAM process; otherwise the cost-minimization model seems natural and will be the structure used to encompass our ideas.

It would be possible to construct our model for the entire CONUS Medical System by adding the geographic dimension to what is discussed below. This, however, is another dimension of complexity which is beyond our analyses (and which may not be within the politically feasible set even if it were cost-effective).

Hence we restrict ourselves initially to study of the regional medical care problem, recognizing that the aggregate of these regions would be the CONUS network, and their sub-optimums yield a reasonable cost-effective solution.

The model chosen is the standard Lagrangian multiplier formulation of constrained minimization:

$$C = PX + P^* (Q-q) + \lambda(q-f(X)) - \gamma(X-X^*-U)$$

The variables are defined below:

C = the total cost of health care of the personnel associated with a medical region. This includes CHAMPUS costs.

P = the vector of prices of the factors of production employed in the Navy Medical Program.

P^* = the vector of prices for the medical services provided by the civilian sector.

X = the matrix of Naval resources employed in the production of health in the various medical service areas.

X^* = the matrix of Naval resources showing the minimum allowable levels.

q = the matrix of health care services by medical specialty provided by Naval medical facilities.

Q = the matrix of total health care services by specialty provided to the beneficiary population from military and civilian sources.

$f(\ )$ = the "production function" which specifies the resource requirements to produce a specified output vector.

U = a slack variable required by $X \geqslant X^*$

γ, λ = Lagrangian multipliers

The objective function is the cost of providing medical care to the beneficiary population, the sum of USN care and civilian care. PX is the cost of the Navy program. Q-q is the care provided in the civilian sector, and P^* (Q-q) is its cost. The two major constraints explicitly included above are (1) the requirements of the production function which specifies the relationship of inputs to outputs and (2) that which insures that the level of medical resources committed to the Navy are above the minimum required for military preparedness–to support a rotation base and for required administrative processing. Additional constraints may be imposed as required. In the formulation "quality" may be considered an implicit constraint, and if we were to work from this model, we would have to find quantitative indicators for quality of medical care.

The variables are vaguely specified above. The two price vectors can be taken as given, making them parameters. (It is not strictly true that the input prices are not a function of the level of demand unless the supply is perfectly elastic.) The problems involved in estimating these prices are, of course, significant for both the civilian and Navy side, especially considering the impact of the AVF on the latter, but the potential magnitude of their impact can be estimated.

The true variables which we wish to consider then are reduced to four: X - the resource inputs; Q - the level of services required by the population, i.e., their effective demand; q - that portion of Q provided in Naval facilities; and the production function itself.

The resource inputs X can be specified as a matrix. They should be allocated along the lines of the cost accounts used in reporting expenses in the Navy Medical EOB. Additionally, there is probably an optimal aggregation of these inputs. Some are too insignificant in terms of the total expenditures. The labor factor is dominant and can be dealt with in two ways. It can be separated into homogeneous groups and the manhours counted. There would probably be at least the following categories: MD's, NC's, MSC's, LPN's, Corpsmen, Other Officers, and Other Enlisted.

Appropriate categories will also be constructed for the civilian staff. Alternatively, the labor inputs can be priced out and the total labor bill used as the measure of the resources employed. Similarly, an apportionment scheme will have to be devised for capital and supply inputs. One unique resource which will also have to be priced in some fashion is the rehabilitating patient. "Rehabs" remain in the hospital and perform functions varying from facility maintenance to medical assistance. To the extent that these inputs have an opportunity cost, they will have to be charged to hospital operation.

These results would be an X matrix for both inpatient and outpatient care which would look something like the following:

	Military Personnel	Civilian Personnel	Maintenance	Capital	Supplies
Medical Service					
Surgical Service					
Ob-Gyn					
Pediatrics					
Neuropsychiatry					
EENT					
Clinical Investigation					
Other Medical Services					
Laboratory					
Radiology					
Pharmacy					
Hotel Services					
Administration					

The second critical matrix to be specified is Q, the effective demand for medical services by the beneficiary population. It must be arrayed by the services demanded and by principal beneficiary components; Active Duty, Dependents, Retired, and Retired Dependents. This requirement of specification is due to the differences in potential variability of the kind of medical service among the beneficiary groups, and the evidence from our analysis is that significantly different levels of resources are employed to care for these different groups. (This is primarily brought to focus by the differences in the length of stay.) The resulting matrix would look something like the following for both inpatient and outpatient care:

	Active Duty	Dependents	Retired	Retired Dependents
Medical Services				
Surgical Services				
Ob-Gyn				
Pediatrics				
Neuropsychiatry				
EENT				
Clinical Investigation				
Other Medical Services				
Laboratory				
Radiology				
Pharmacy				
Hotel Services				
Administration				

A major question is how to express the demand for these services, i.e., the elements of the above matrix. A poor choice is to use the workload indicator of "occupied bed days." The reasons are twofold: first, this statistic appears to be seriously biased in that some patients are in intensive-care units while others are basically receiving hotel services only. The second reason is that this would limit the investigation from attempting to modify the length of stay. A better alternative is the number of cases—perhaps admissions and outpatient visits. Careful investigation is required to assure that a homogeneous mix of cases are treated when comparing facilities, or an appropriate adjustment will be called for. This formulation should be better suited to making comparisons to CHAMPUS, where whatever transfers would take place would be cases, and only indirectly in occupied bed days.

The demand for services Q, has been taken as given up to this point. We also want to consider altering it. Of course, the basic incentive to alter the level of consumption of a good is some sort of price mechanism—such as co-insurance in medical economics. We will also investigate the existing "time pricing" mechanism where demand is controlled by the amount of time spent in the queue waiting for medical service.

Finally the production function f(X) must be specified in terms of its structure. First it must represent the technical frontier—the most that the resources can produce. This is sometimes referred to as technical efficiency. For this particular problem there are two implications—the resources must be fully utilized and their location or attachment to the elements of the regional system must be optimal. Secondly, the functional relationship among dispensaries, hospitals, and medical centers must suit the resource distribution. Optimization by the Lagrangian method selects the resources most appropriate to do the job, *once these technical feasibilities are known.*

The production function itself must translate case loads into resource requirements. This relationship would have to be investigated empirically, but probably not through curve-fitting econometric techniques. The reason is that to properly employ this method, it has to be assumed that, given the resources available, they are being used in the most cost-effective manner. (The real world invalidates this technically feasible assumption. Some hospitals show very low utilization and others may be understaffed.)

The above discussion outlines the basic framework for our analysis. It shows that the major emphasis of our research must be on the manpower requirements of the actual delivery of health care, and that any "optimization" should occur at the region level. This model would also point to the kinds of alternatives to be considered; the potential trade-offs among the resource inputs, consideration of the structure of the functional relationships within a region, the alternative sources of supply (CHAMPUS), and the idea of increasing the utilization of resource inputs.

This theoretical structure can be neither analytically solved nor programmed and simulated to derive the optimal allocation of resources and health levels. Many of the required inputs have not been specified, others cannot be parameterized, and the constraints are only vaguely stated. But the model does form the basis for our analysis. It demands that we identify the population segments and their effective demand for a clearly specified output. It shows that the first-order marginal conditions required that trade-offs be considered, not only in what is produced but how to produce it and by whom. Finally, it requires that the constraints define the feasible set of solutions. All of these considerations must be included, at least implicitly, in any meaningful analysis.

We found that after taking into account a number of real-world constraints and coupling them with some working assumptions, we were able to construct a practical approximation of the model. We formulated a series of separable equations that calculate total costs according to inputs provided by the user. By varying the inputs—the assumptions to be studied—we were able to evaluate different policy scenarios in terms of cost and fill in the cells of the model's matrices (with the service categories reduced to three because of data limitations).

This cost equation does not allow us to find "optimized" resource and delivery configuration (the global maximum); rather, it provides a sub-optimal solution based on the inputs and assumptions.

3.2 Cost Estimating—the Constraints

We begin by specifying the constraints which it seems to us must be at least implicitly recognized in considering feasible alternatives for the problem of Naval health care delivery. The interaction of the various forces of demand and supply determines the ultimate mix of medical services, both by "type" and source of supply. The components which need ultimately to be examined as part of a comprehensive analysis of the health care delivery problems are: the size of the potential populations; the functional relationship between outpatient and inpatient health care needs; the resource flow and factors influencing that flow into both the civilian and Navy medical sectors; and the relative effectiveness and efficiency of the methods in which these resources are combined to produce medical services.

In the Navy, however, as in other military services there are some unique military, geographical, and traditional/political considerations which must be taken into account in any analysis.

1. *The merging of Army, Air Force, and Navy medical care into one "purple suit" medical service is not likely to be accomplished in the near term.*

   It does not appear desirable to attempt to accomplish the merger of the health care delivery systems of all services without a more thorough investigation of the military effectiveness as well as efficiency considerations. In addition, the long traditions of the individual services, especially the Army and Navy, impose a sensitive political dimension in this regard. Our methodology is limited, at least formally, therefore, to the consideration of the Navy and "civilian" provided health care as alternatives. The potential for the provision of a significant amount of health services through facilities controlled by the Veteran's Administration and the Public Health Service does not appear great and these are not explicitly considered in our methodology.

2. *Shipboard medical care must be treated separately from the CONUS problem and other fixed-base health care.*

   Shipboard medical care is under the control of the line commanding officers and is quite obviously severely constrained in terms of flexibility by geographical and facility considerations. The methodology which follows does not include disaggregated costing of shipboard medical care, although the results of a separate shipboard analysis can be quite simply added to the cost estimates derived from this methodology.

3. *A large enough resource base of military physicians, nurses, paramedical personnel, and facilities must exist to provide a rotation base for shipboard medical care and for minor contingency planning.*

   This constraint is dictated by military preparedness requirements. It does not require, however, that all medical staff, including doctors, be Navy personnel, or that all medical facilities be owned by the Navy. The methodology does not provide for any excess capacity to provide a surge capability in support of major wartime contingencies. Wartime casualties would probably be cared for by the existing medical personnel, in or out of uniform.

4. *As a minimum, enough capability must exist in Navy controlled facilities to meet the peacetime requirements of active duty personnel.*

   This, in essence, amounts to a legal constraint which obligates the Navy to "fix" any medical problem which arises during any member's active duty. Conceptually, it would be possible to provide all health care, even for active personnel, via the civilian sector. However, the number and kind of medical needs generated by the nature of the military service occupation, the need for a quick, effective response and, in many instances, the geographical problems limiting any realistic civilian alternative require that the Navy be in the health care delivery business.

It must be stressed, however, that this does not require that all Navy personnel regardless of location and/or severity of their medical service needs must receive their medical care in Navy facilities. In many instances, civilian contracting of one form or another and/or temporary care in civilian facilities pending transportation to major Naval facilities some distance away should be weighed as a realistic alternative.

5. *Medical care must be provided in some fashion for the dependents of active personnel and retired personnel and their dependents.*

   This is a legal obligation of the Navy as well as a consideration for recruiting in the all-volunteer-force environment. Again though, this does not require that all or even the major portion of care be provided in Navy facilities or on a "free" basis. For any new policies careful attention should be given to ensure that the health needs of dependents and retired population are met. Consistent with this, however, realistic civilian-sector alternatives and even pricing mechanisms to help control the demand at Navy facilities can be used to ensure the provision of an adequate level of health care to these beneficiary groups.

6. *Active duty personnel must be fully recovered from any medical condition before returning to their normally assigned duties.*

   This constraint is dictated by military preparedness requirements. It does not require, however, that all active duty personnel must be so recovered, nor does it require that such recovery must take place in a hospital environment.

7. *For effective management and control, the medical "regions" recently established by BuMed should be used as the geographical areas within which to consider alternative health care delivery systems.*

   This constraint is really a practical one concerning BuMed's planning, budgeting, and resource management under the newly instituted Regionalization Program. This is not to say that region boundaries might not ultimately be altered, that all the medical resources contained within each region are necessary, or even that the management organization of each region should be treated as fixed. However, it does appear to be unrealistic at this early point in the Regionalization Program to consider major trade-offs across regions or significant redefinitions of regions.

Together with these constraints we have identified the following elements of change to be considered as a part of our cost analyses. Of course, the number of alternative medical care programs is considerably more than this, since one or more elements may be combined to some degree.

1. *Increasing the efficiency of resource utilization in the Navy medical facilities.*

   Possible steps include the improved allocation of paramedical personnel, the consolidation or elimination of underutilized facilities, outpatient modernization to increase the flexibility of facilities, changing the size of major medical facilities to just capture all possible economies of scale, and altering "corporate limits" for medical personnel to be aligned with the BuMed regions to increase the set of medical personnel allocation possibilities within an area. This aspect is in reality composed of several different but related "efficiency" considerations, some of which will need to be analyzed in more depth before the true cost implications can be determined.

2. *Limiting resources to the Navy medical program, both capital and labor, to those necessary only to meet the needs of the active duty population.*

   This would amount to allowing the dependents of active duty personnel, retired, and retired dependents to receive medical care through Navy operated faciliites only to the extent necessary to use "excess capacity" in those areas where the capacity necessary to effectively meet the needs of active duty personnel is greater than can be fully utilized by that beneficiary group alone. All other dependent, retired and retired dependent care would then be provided by the civilian sector via CHAMPUS. Exceptions to this rule would have to be made in those cases where geographical location creates great difficulty for the dependents of active duty personnel to receive medical care in non-Navy facilities.

3. *Eliminating for dependents, retired, and retired dependents all outpatient care at Navy medical facilities.*

   This would mean that all outpatient care for these beneficiary groups would be met through CHAMPUS by the civilian sector. Again, exceptions would have to be made in those cases where due to geographical location a reasonable civilian alternative is not available.

4. *Instituting a "co-insurance" feature for all care provided to non-active duty personnel through Naval medical facilities.*

   Care to these groups would continue to be supplied on a "space available" basis. The co-insurance feature might be applied at a diminishing rate up to some maximum dollar limit beyond which care would continue to be provided as presently on a "free" basis as available resources will allow.

5. *Eliminating all long-term convalescent (rehabilitation) care for active duty personnel from Navy hospitals.*

   This convalescent care would be provided in "nursing" facilities comparable in makeup and quality to civilian-sector convalescent care facilities. Alternatively it could be provided via contracts with civilian owned and operated facilities.

6. *Reducing the active duty military component of the Navy staff of doctors, nurses, paramedical personnel, and facilities to that level necessary only to provide a rotation base for peacetime shipboard care and minor contingency planning.*

Such "dimensions" may pose different operational and implementation problems given among other things the long tradition of Navy medical care and its structure today. Nevertheless, it seems worthwhile to consider the cost implementations of each and, in some instances, two or more considered simultaneously in order to determine the potential magnitude of resource savings possible, at least in principle, under different approaches to providing an adequate level of health care to all beneficiary groups.

Definitive analyses of these dimensions are impossible given the present paucity of data and the absence of detailed subanalyses on both the demand and the supply side of the question. The methodology that is outlined below, however, can be used with the best "parameter" estimates available to explore the implications of these changes as well as others thought to be appropriate either by the Office of Navy Program Planning or the Bureau of Medicine and Surgery.

3.3 Cost Estimating—A Methodology

We propose to use the following cost equation to consider the implication of different health care delivery scenarios:

$$C^R = \sum_i \sum_j I(_{ij}^R \; CI_j^R) + \sum_i O_i^R \, CO^R + \sum_i \sum_j (C_{ij}^R \, PC_j^R) + \sum_i V_i^R \, PV^R \qquad (1)$$

Where,

R = the USN/BuMed Medical Region of interest.

i = the beneficiary group (e.g., active duty, dependent, retired, retired dependent). The ultimate breakdown here will have to be determined by what the data will allow and what is necessary to realistically consider alternatives.

j = the type of inpatient medical service provided (e.g., acute/continuous, extended care, and other categories that may be provided).

I_{ij}^R = the number of "authorized" inpatient days in USN medical facilities in region R for beneficiary group i for medical service type j.

CI_j^R = the long-run marginal cost per inpatient days for medical service type j in region R, including appropriate allocations of supporting or auxiliary activities.

O_i^R = the number of outpatient visits to Navy outpatient facilities by beneficiary group i in region R.

CO^R = the long-run marginal cost of outpatient visits in region R, including appropriate allocations of supporting or auxiliary activities.

C_{ij}^R = the number of civilian (CHAMPUS) inpatient cases for beneficiary group i for medical service type j in region R.

PC_j^R = the price per case paid by CHAMPUS for civilian care of medical service type j in region R.

V_i^R = the number of civilian (CHAMPUS) outpatients visits by beneficiary group i in region R.

PV^R = the price paid by CHAMPUS per outpatient visit in the civilian sector in region R.

Equation 1, then, if reasonable estimates for each input can be found, would represent the total cost of the provision of health care to Navy and related personnel in one medical region. The total costs of the Navy medical program would then be calculated using Equation 2:

$$TC = \Sigma C^R + SB + OC \qquad (2)$$

Where,

C^R = total costs of the provision of health care in region R as calculated above.

SB = the estimated costs of shipboard-provided medical care not included in the calculations of C^R.

OC = the estimated costs of other medical care not included in the calculations for C^R or SB (e.g., the costs for medical care provided by dispensaries and other medical facilities not "regionalized" and not under control of the Bureau of Medicine and Surgery; the costs of preventive care programs; and certain "fixed costs" of having a viable medical program, such as some research which cannot be meaningfully allocated).

To calculate total costs some estimates will have to be made for SB and OC, but detailed analyses for these dimensions of Navy medical care are beyond the scope of this study. Further, the vast majority of costs will be included in the calculations of C^R for each region, and it is on this part of Equation 2 that our effort is concentrated.

Our intent is to write a simple computer algorithm that would be in the nature of a bookkeeping routine to calculate the costs of alternatives for each region and to calculate the total cost implications according to Equation 2. The inputs to this model will be provided through a series of "lookup" tables and/or a defined function for each variable where the inputs to the function would be based in turn on tables containing estimates. We turn now to a brief discussion of the major factors influencing each variable and an indication of how each will be estimated.

I_{ij}^{R} represents the number of "authorized" days at Navy medical facilities in region R for beneficiary group i and for medical service type j. Some of the factors which affect the magnitude of this variable are policy controlled while others are exogenous. Exogenous factors would include the size of each beneficiary population in the region, the age/health characteristics of each beneficiary group, the severity of the cases involved, and the availability of civilian substitutes to Navy provided care. Factors which are regarded as policy controlled are the effectiveness/efficiency of the inpatient delivery system and "authorization" decisions about what space will be made available in USN facilities for each i and j. The value for each I_{ij}^{R} will be calculated by a simple equation which will utilize inputs from a table of "standards" concerning the time required for each type of medical service and "policy parameters" which are multiplicative constants and can be manipulated to reflect policy decisions concerning the degree to which the requirements of each beneficiary group will be provided in Navy facilities. For example, consider ob-gyn care for dependents of active duty personnel. Everything from zero to 100 percent of this particular inpatient need for this particular population might be met in Navy facilities. The calculation of I_{ij}^{R} in this case would be determined by the "standard" time required for this type of medical service and the number of cases to be treated as determined by the policy alternative that is specified as, say, authorized beds to be made available for this particular type of medical service and for this beneficiary population. The equation for this particular variable might very well hinge then on the basis of "authorized operating beds available" and an assumption about maximum occupancy rate possible.

CI_{i}^{R} represents the long-run marginal cost per authorized bed day of medical service j in region R. This variable will be defined consistent with I_{ij}^{R} above. Some of the factors that will have to be explicitly considered in the calculations and are the subject of other BCS Navy medical study working papers are: salary scales including dollars involved for an AVF bonus, the mix of different labor types, the estimation and allocation of "indirect" costs, the treatment of capital costs, the handling of training costs, the "scale" of operations, the allocation of some auxiliary costs, and some estimates for "potential efficiency gain." CI_{j}^{R} will come from a simple equation that simply sums up the various cost components, where each cost component is taken from a lookup table and can be adjusted by a "policy parameter" in those instances where that is applicable (e.g., with respect to the AVF bonus).

O_{i}^{R} is the number of outpatient visits to Navy outpatient facilities in region r by beneficiary group i. It is, of course, determined by availability of substitutes in the civilian sector, the relative price of Navy versus civilian provided care, the age/health characteristics of the beneficiary population, and the relative time opportunity costs involved with receiving outpatient care from the Navy vis-a-vis the civilian sector. O_{i}^{R} will be calculated from an equation which will build from estimates of present behavior in this regard by the different beneficiary populations in the region and adjusted by a "parameter" which is a function of different assumptions about policy and the estimated demand response to these different policies. As discussed elsewhere, this is dependent critically upon making some assumptions about the response of the level of demand to different "prices" for outpatient care (the "elasticity" of demand).

CO^{R} is the long-run marginal cost per outpatient visit in region R. This variable is dependent upon the same cost factors discussed for CI_{j}^{R} above. Estimates will be derived on the basis of a similar expression using variables whose values are taken from established lookup tables based on previous analyses and adjustment parameters to reflect different policy considerations. In addition, the

equation to calculate CO^R might include a variable representing some "revenue offset" which would be revenue collected (and thus available to offset costs) should some co-insurance feature be introduced for care provided to dependents and/or the retired dependent population.

C_{ij}^R represents the number of civilian cases treated through CHAMPUS for beneficiary group i for medical service type j in region R. This variable is dependent upon many of the same factors affecting I_{ij}^R including the age/health characteristics of the beneficiary group and the size of the beneficiary population in the region. It will also, of course, be affected by those policy parameters manipulated in calculation I_{ij}^R; namely, the space to be made available in Navy facilities coupled with some assumption about the price elasticity of demand for civilian inpatient care and applied to all those cases not "authorized" for service in Navy facilities. C_{ij}^R will therefore be based on an expression that uses inputs of current civilian provided inpatient care adjusted by parameters which reflect consequences of changes in policy with respect to the magnitude of care provided in Navy medical facilities.

PC_j^R equals the price per case paid by CHAMPUS for civilian medical care of type j in region R. This is to be derived from the average civilian provided case cost in the region and the percentage of that cost picked up by CHAMPUS. PC_j^R will therefore be taken from lookup tables based on previous analyses of the CHAMPUS activity and costs in each region.

V_i^R is the number of civilian outpatient visits obtained through CHAMPUS by beneficiary group i in region R. It is affected by the same exogenous considerations as O_i^R and those policy parameters manipulated to affect O_i^R. V_i^R will be calculated on the basis of a lookup table reflecting the current outpatient activity in each region from each beneficiary population and adjusted according to the estimated response to the changes in policy parameters for O_i^R. Again, assumptions about the elasticity of demand for outpatient care as based upon previous analyses are described in Chapter 4.

The variable PV^R represents the price paid per civilian sector outpatient visit in region R. It is dependent on the average cost of civilian provided care in the region and the percentage of those costs picked up by CHAMPUS. The estimates for PV^R will come from a table established from our completed CHAMPUS profile.

3.4 Concluding Comments

As mentioned previously, much of the information required to get precise estimates for the variables involved in Equation 1 is not available. In many cases the required disaggregate analyses to determine such critical relationships as that between the size and age and socioeconomic characteristics of the beneficiary population and medical care needs, and the income and price elasticities of demand disaggregated according to type of medical service have not been done.

Nevertheless, enough data is available from Navy data sources and from CHAMPUS statistics, along with assumptions derived from analyses of various health care delivery systems in the civilian sector and previous military studies, to allow estimates to be derived. It is anticipated that these estimates will be useful for planning and discussion.

4.0 DATA AND ADJUSTMENTS

Many study groups have criticized the Bureau of Medicine and Surgery's information reporting systems which supply both the financial and workload data. However, it seems to us that few of these criticisms are based on systematic analysis. Even the valid criticisms have not been carried to their logical conclusions by adjusting the raw data to reflect better indicators of the inputs, outputs, and measures of efficiency. The modifications we have determined are required have been mentioned before: modification of the cost of labor to reflect total expenses; inclusion of the full cost of capital; and adjustment to the activity indicator for inpatient care. The requirements for these adjustments will be justified in this chapter. However, it is also important to understand how the data is reported and the financial implications of making these adjustments. Therefore, we begin with the description of the reporting system and the costs that it calculates. A discussion of the deficiencies in this system and the adjustments that are required follows. Finally, the chapter concludes with a discussion of the financial impact of the adjustments on the average costs reported by BuMed.

4.1 The Reporting System

Not every Navy dispensary or hospital reports its financial and activity data directly to the Navy Medical Data Services Center at Bethesda. Rather, since regionalization the data is first reported to the Navy Regional Medical Center and then to Bethesda. None of the dispensaries report their data directly, and three of the hospitals (Cherry Point, Quonset Point and Whidbey Island) don't either. Instead, the data from these three hospitals is reported through their regional centers (Camp Lejeune, Newport and Bremerton Regional Medical Centers). Those that do report as a separate activity are shown on Table 4-1 with their associated unit identification code (UIC). These UIC's will be used in the presentation of some of the data in later tables.

The design of the financial reporting system is essentially a good one. Generally, it attempts to allocate the costs reported to the output measures used. While some of these output measures are in fact only intermediate goods, such as training and professional development, they are clearly identified. More importantly, reported costs associated with inpatient and outpatient care are clearly allocated to those cost centers.

While the workload data is reported summarily along with the financial data, it is reported in greater detail through the inpatient and outpatient statistical reporting systems. For inpatient care the number of admissions and live births and the average daily patient load is reported by beneficiary category: active duty members of the uniformed services, retired members of the uniformed services, dependents of members of the uniformed services, and other patients. Additionally, the branch of service is reported. The number of outpatient visits of each of these same beneficiary categories is also reported. The adjunct services, which is some measure of the level of sophistication of treatment, are also reported for each regional medical center as well as those dispensaries that have not been regionalized. Even with the additional information that the adjunct services provide, of course, these indicators do not give very detailed information. Again, the problem is one of attempting to summarize too much information in one indicator. Admissions to hospitals are classified according to the Department of Defense Disease and Injury Code, which is based on the World Health Organization's seventh edition of the International Classification of Disease and

TABLE 4-1

UIC'S FOR ACTIVITIES REPORTING TO BETHESDA DATA SERVICES

UIC	Activity	
00105	Naval Hospital	Portsmouth, N.H.
00112	Naval Hospital	Chelsea, Mass.
00154	Naval Hospital	Philadelphia, Pa.
00162	Naval Hospital	Annapolis, Md.
00168	National Navy Medical Center	Bethesda, Md.
00203	Naval Aerospace Medical Center	Pensacola, Fla.
00211	Naval Hospital	Great Lakes, Ill.
00231	Naval Hospital	Quantico, Va.
00254	Naval Hospital	Bremerton, Wash.
00267	Naval Hospital	Key West, Fla.
00285	Naval Hospital	Corpus Christi, Tex.
00352	Naval Hospital	Guam
00416	Naval Hospital	Camp Lejeune, N.C.
00619	Naval Hospital	Oakland, Calif.
0498A	Naval Hospital	Bethesda, Md.
0499A	Naval Hospital	Pensacola, Fla.
0608A	Naval Dental School	Bethesda, Md.
0619A	Naval Medical School	Bethesda, Md.
0620A	Hospital Corps School	Great Lakes, Ill.
0621A	Hospital Corps School	San Diego, Calif.
0622A	Naval School Hospital Administration	Bethesda, Md.
0751A	Naval Aerospace Medical Institute	Pensacola, Fla.
60002	Naval Hospital	Memphis, Tenn.
60008	Naval Hospital	St. Albans, L.I., New York
60285	Naval Hospital	Camp Pendleton, Calif.
61337	Naval Hospital	Beaufort, S.C.
61564	Naval Hospital	Guantanamo Bay
61726	Naval Submarine Medical Center	New London, Conn.
62499	Naval Hospital	Yokosuka, Japan
64211	Naval Hospital	Long Beach, Calif.
65428	Naval Hospital	Roosevelt Roads, P.R.
65491	Naval Hospital	Subic Bay, P.I.
65492	Naval Hospital	Orlando, Fla.
66095	Naval Hospital	Lemoore, Calif.
66096	Naval Hospital	Naples, Italy
66098	Naval Hospital	Patuxent River, Md.
66099	Naval Hospital	Port Hueneme, Calif.
66101	Naval Hospital	Rota, Spain
66102	Naval Hospital	Taipei, Formosa
66818	Tidewater Regional Medical Center	Portsmouth, Va.

TABLE 4-1

UIC'S FOR ACTIVITIES REPORTING TO BETHESDA DATA SERVICES (CONT'D)

UIC	Activity	
68056	Naval Regional Medical Center	San Diego, Calif.
68084	Naval Regional Medical Center	Charleston, S.C.
68085	Naval Regional Medical Center	Jacksonville, Fla.
68086	Naval Regional Medical Center	Newport, R.I.

Injuries. However, the most current tabulations for these classifications made available to us are for the period July–December, 1969, which is pretty old for making management decisions. The workload activity data for outpatient care is available by clinical specialty, but only at the regional level.

The financial and the workload activity data has been summarized in Tables 4-2, 4-3, and 4-4 for inpatient and outpatient care and as an expense summary. The standard cost indicator used for inpatient care is the cost per occupied bed day. This has been reported in column 8 on Table 4-2. For all medical regions the average cost was reported to be $74. Also reported are the number of occupied bed days accounted for by each of the beneficiary groups. The total cost is as reported in the Expense Operating Budget. Clearly some of the data is erroneous. While it is understandable that those activities with the primary function of education should report no workload and perhaps zero expense, it is clear by the unit costs that for some medical regions either the workload has been over reported or not all of the expenses have been accounted for. For example, Roosevelt Roads (UIC 65428) clearly must be misrepresenting its cost of operations. Additionally, further analysis has shown San Diego (68056), Orlando (65492), Beaufort (61337), and Pensacola (0499A) have reported inpatient activity occurring at the dispensaries with inpatient workload, but have not allocated any of the expenses of those dispensaries with inpatient costs. Instead, these costs have been allocated to outpatient expenditures with the result that the unit cost for inpatient care is underreported and the unit cost for outpatient care is overreported.

The outpatient workload activity and cost are reported by UIC on Table 4-3. Again there are the obvious data problems implied by the average cost of outpatient visit. Roosevelt Roads (65428), Pensacola (0499A), and Newport (68086) just can't be reporting their data accurately. Additionally, there is the problem alluded to above of the allocation of some inpatient expenses to outpatient care. Without adjusting for any of these data problems the reported cost for an outpatient visit was $8.

Table 4-4 presents an expense summary for each of the medical units reporting. As was discussed earlier, not all of the expenses of the medical regional centers are allocated to inpatient or outpatient care. There are other outputs which are primarily intermediate goods that are not allocated to either of these other indicators. The amounts not allocated are shown in column 4. The total expense at each unit is reported in column 5 and the percent of the total that has not been allocated to inpatient or outpatient cost centers is reported in column 6. In total, 11 percent of the expenses have not been allocated.

The information presented above is not adequate for making sound management decisions. The vector of prices used to cost military labor is incorrect. The capital costs have not been explicitly accounted for in the Expense Operating Budget's financial data. Finally, the output indicators have been biased to the extent that they are misleading.

Adjustments to these data are not easily made. Because all of military labor is counted as one expense element, independent of grade and officer/enlisted status, it is not possible to change the vector of prices and recalculate what the costs should be. Additionally, the EOB financial information system is ill suited to further analysis beyond the scheduled reports. This results because much of the data is not reported to Bethesda due to regionalization, and once that data is reported, after initial processing much of it is destroyed. Secondly, there is no schedule of the

TABLE 4-2

INPATIENT STATISTICS

(FY 73, Q1 + Q2)

UIC	ADU	OCCUPIED BED DAYS DEP	RET	RET DEP	OTHER	TOTAL COST	UNIT COST
00105	3794	2350	714	1715	137	1064072	122
00112	23447	5125	8761	7074	519	3768512	83
00154	74374	8271	13974	9341	16928	8139151	66
00162	1922	1201	1237	1548	46	951888	159
00168	0	0	0	0	0	1805694	0
00203	0	0	0	0	0	99608	0
00211	49072	7166	7126	5460	351	5302685	76
00231	4671	3514	792	1048	139	1213993	119
00254	10175	3496	2118	2681	179	1830843	98
00267	6960	2278	847	610	105	1042874	96
00285	7596	2950	1244	1324	636	1493201	108
00352	9798	4939	771	1089	4220	2477789	119
00416	36532	12764	2382	2502	102	3579938	65
00619	59128	8869	9496	10786	549	8046784	90
0498A	40712	14467	16401	15485	1830	6292927	70
0499A	16799	4600	4669	2758	333	1377343	47
0608A	0	0	0	0	0	577015	0
0619A	0	0	0	0	0	222081	0
0620A	0	0	0	0	0	0	0
0621A	0	0	0	0	0	188	0
0622A	0	0	0	0	0	106325	0
0751A	0	0	0	0	0	74042	0
60002	13894	4311	1910	2672	155	2241522	97
60008	28148	1434	6390	4222	319	4329069	106
60285	27725	7054	3565	3676	156	3714420	88
61337	18128	3131	680	1375	40	1809736	77
61564	3037	1005	11	10	1823	805054	136
61726	7519	2573	441	508	74	774769	69
62499	7741	2054	431	182	455	1355528	124
64211	47109	3888	7974	6545	734	3946248	59
65428	4964	1933	589	1460	85	152197	16
65491	14193	2746	169	234	1241	881120	47
65492	27120	2878	4667	4490	59	2440956	62
66095	2933	2397	271	288	0	597261	101
66096	8611	3407	35	166	438	962977	76
66098	1496	1733	126	256	24	623463	171
66099	2802	2435	892	1516	45	704721	91
66101	3664	2205	129	82	225	462880	73
66102	2605	2954	32	122	428	560254	91
66818	91876	26869	12405	12911	588	8384589	57
68056	142281	23691	23621	15283	2969	11409718	54
68084	24042	8106	3060	4469	146	2959963	74
68085	25910	7308	5409	5215	317	3420050	77
68086	23407	6797	2543	2146	90	1696255	48
TOTAL	874185	202899	145882	131244	36485	103699703	74

TABLE 4-3

OUTPATIENT STATISTICS

(FY 73, Q1 + Q2)

UIC	ADU	OUTPATIENT VISITS DEP	RET	RET DEP	OTHER	TOTAL COST	UNIT COST
00105	4450	15169	2678	5802	479	328808	11
00112	10561	18077	8945	14649	1232	995055	18
00154	16253	30108	12042	17011	5962	853927	10
00162	3860	16112	5611	11736	402	376370	9
00168	0	0	0	0	0	7895	0
00203	0	0	0	0	0	154358	0
00211	119120	64376	12498	16937	4917	2003810	9
00231	7688	40215	3343	5897	680	460234	7
00254	42528	53012	13290	24889	16642	1190867	7
00267	5360	27905	3172	4400	318	408232	9
00285	3158	24768	4961	3454	530	502424	13
00352	22439	36451	2001	3478	11241	666938	8
00416	102285	136875	6759	6225	5084	1505642	5
00619	22835	49305	23437	46237	2551	1550649	10
0498A	34025	100408	22031	39829	3164	2397099	12
0499A	58298	81386	15468	24874	6553	315916	1
0608A	0	0	0	0	0	0	0
0619A	0	0	0	0	0	0	0
0620A	0	0	0	0	0	0	0
0621A	0	0	0	0	0	0	0
0622A	0	0	0	0	0	0	0
0751A	0	0	0	0	0	148201	0
60002	34477	42295	4621	12399	1168	1134331	11
60008	9389	15720	9585	17665	1634	629359	11
60285	54467	71890	16541	19368	1614	1362747	8
61337	45742	31628	2382	4429	306	615068	7
61564	8625	8660	1224	1733	8202	132960	4
61726	27004	46433	4102	1988	964	550177	6
62499	11999	18199	729	273	2536	556187	16
64211	46118	65600	25816	39958	17428	2089817	10
65428	10781	14539	1962	6181	1985	47740	1
65491	10605	17811	1040	614	2481	393001	12
65492	92266	22349	18091	39401	663	1449265	8
66095	9043	24715	821	1574	240	318398	8
66096	10381	17083	460	354	2208	241031	5
66098	11442	25571	1342	1638	1234	254083	6
66099	10637	23633	7434	12929	2166	405241	7
66101	8463	22277	365	369	4629	225552	6
66102	5689	14615	281	419	2247	304808	13
66818	132240	318100	28209	37520	28551	4624681	8
68056	306111	236437	47354	66554	23949	6208266	9
68084	28035	84344	10208	12995	8991	965328	6
68085	45627	102484	18821	33597	5863	1838415	8
68086	41015	98328	6726	6135	7647	431960	2
TOTAL	1413016	2026878	344350	543511	186461	38644840	8

TABLE 4-4

EXPENSE SUMMARY

(FY 73, Q1 + Q2)

(1) UIC	(2) INPATIENT	(3) OUTPATIENT	(4) UNALLOCATED	(5) TOTAL	(6) (4)/(5)
00105	1064072	328808	70029	1462909	4
00112	3768512	995055	1127250	5890817	19
00154	8139151	853927	875764	9868842	8
00162	951888	376370	117827	1446085	8
00168	1805694	7895	470135	2283724	20
00203	99608	154358	-70606	183360	-38
00211	5302685	2003810	642099	7930594	7
00231	1213993	460234	71797	1746024	4
00254	1830843	1190867	236969	3258679	7
00267	1042874	408232	117042	1568148	7
00285	1493201	502424	168962	2164587	7
00352	2477789	666938	120919	3265646	3
00416	3579938	1505642	486073	5571653	8
00619	8046784	1550649	2065536	11662969	17
0498A	6292927	2397099	1264519	9954545	12
0499A	1377343	315916	107043	1800302	5
0608A	577015	0	253790	830805	30
0619A	222081	0	740408	962489	76
0620A	0	0	1063228	1063228	100
0621A	188	0	1207499	1207687	99
0622A	106325	0	93625	199950	46
0751A	74042	148201	236482	458725	51
60002	2241522	1134331	115289	3491142	3
60008	4329069	629359	484102	5442530	8
60285	3714420	1362747	340194	5417361	6
61337	1809736	615068	294107	2718911	10
61564	805054	132960	21405	959419	2
61726	774769	550177	330113	1655059	19
62499	1355528	556187	240753	2152468	11
64211	3946248	2089817	679994	6716059	10
65428	152197	47740	-4036	195901	-2
65491	881120	393001	5494	1279615	0
65492	2440956	1449265	42729	3932950	1
66095	597261	318398	98490	1014149	9
66096	962977	241031	42238	1246246	3
66098	623463	254083	34277	911823	3
66099	704721	405241	79902	1189864	6
66101	462880	225552	37155	725589	5
66102	560254	304808	93995	959057	9
66818	8384589	4624681	2170292	15179562	14
68056	11409718	6208266	1709728	19327712	8
68084	2959963	965328	576614	4501905	12
68085	3420050	1838415	512959	5771424	8
68086	1696255	431960	22348	2150563	1
TOTAL	103699703	38644840	19376532	161721075	11

amortization of capital over its useful life but rather only an undepreciated reporting of the acquisition cost of land, plant, and equipment. Finally, the only output measure reported for inpatient care on the short term is the number of occupied bed days and the admissions. That information reported in the DDDIC is four years old and is only available at Bethesda for the active duty population. The reporting system does not tabulate similar documents for the civilian beneficiaries. As a result of all of the above, even if the need for adjustment is substantiated, the management information system will not provide us with the necessary tools for adjustment. The adjustments will have to be made on a more aggregated basis.

4.2 Costing Military Manpower

The expense of military manpower is currently costed at the composite standard military rate. The composite rates being used for FY 73 are included as Table 4-5. These standard rates are reported only for the pay grade and are independent of years of service. In effect a weighted average has been taken over the members with differing numbers of years of service of each pay grade to determine the composite standard military rate. This pay rate is a measure of the wages and fringe benefits for which officers and enlisted men qualify. It includes not only basic pay but also basic allowance for quarters, miscellaneous expense, subsistence (in cash and in kind), station allowance, uniform and clothing allowance, family separation allowance, Social Security contributions, death gratuities, servicemens' life insurance, reenlistment and variable reenlistment bonuses, apprehension of military deserters, and interest on uniform service savings deposit. Also included are the incentive and special pay for aircrews and submarine duty, other hazardous duty, physicians and dentists, duty at sea at certain locations, proficiency pay, and hostile-fire pay. An acceleration factor is included to provide a pool of retirement benefits, leave, and holidays. In short, the composite pay rate attempts to allocate the total cost the government accrues in wages and fringe benefits by employing military labor. It is an average within the pay grades. Many officers and enlisted men will receive more or less than this actual composite pay rate. Its use has been based on the justification that a more accurate estimate of the cost would probably be impossible because many of the expenses are incurred today but will not be paid by the government until some future time and even then with uncertainty. The best example of this is the retirement benefits, earned during the years of service but paid only on the completion of at least the twentieth year. Even this allocation of wages and fringe benefits may be biased when it is applied to special segments of the military labor force. For example, we can observe immediately that if physicians receive more continuance and special pay than do other officers of the same pay grade, then this average wage is too low.

The military manpower that is charged to the medical facilities expense is at the composite standard rate. Naval hospitals are charged for staff assigned at the end of the month or when payment is made. For example, if an officer or enlisted man were transferred from the hospital effective the 29th of the month, there would be no cost allocated to the hospital. If that same individual were transferred to the hospital on the 29th day of the month, the hospital would be allocated an entire month's composite rate.

TABLE 4-5

COMPOSITE STANDARD MILITARY RATE TABLES
EFFECTIVE 1 APRIL 1973

Pay Grade	Monthly Rate				Annual Rate			
	Navy	Marcorps	Air Force	Army	Navy	Marcorps	Air Force	Army
0-10	$3,475	$3,484	$3,535	$3,337	$41,700	$41,811	$42,425	$40,049
0-9	3,230	3,174	3,323	3,150	38,758	38,093	39,880	37,795
0-8	3,047	2,966	3,033	2,904	36,565	35,593	36,396	34,842
0-7	2,693	2,625	2,692	2,624	32,316	31,501	32,300	31,485
0-6	2,406	2,314	2,430	2,333	28,876	27,768	29,154	27,999
0-5	2,012	1,968	2,076	1,882	24,146	23,610	24,911	22,579
0-4	1,683	1,649	1,728	1,540	20,190	19,784	20,733	18,475
0-3	1,421	1,401	1,378	1,312	17,056	16,810	16,530	15,742
0-2	1,114	1,104	1,084	953	13,370	13,249	13,005	11,437
0-1	856	827	876	779	10,266	9,924	10,517	9,344
W-4	1,530	1,511	1,547	1,493	18,356	18,135	18,558	17,911
W-3	1,362	1,289	–	1,237	16,346	15,469	–	14,839
W-2	1,138	1,137	–	1,115	13,660	13,638	–	13,381
W-1	1,028	883	–	854	12,339	10,601	–	10,242
E-9	1,265	1,270	1,241	1,268	15,178	15,236	14,893	15,220
E-8	1,110	1,066	1,091	1,097	13,323	12,793	13,096	13,159
E-7	971	937	956	932	11,650	11,241	11,476	11,188
E-6	843	806	846	800	10,120	9,667	10,156	9,599
E-5	688	646	716	617	8,261	7,765	8,594	7,409
E-4	594	550	599	539	7,132	6,599	7,187	6,469
E-3	521	483	516	504	6,253	5,791	6,189	6,051
E-2	480	460	494	480	5,757	5,521	5,922	5,755
E-1	428	421	454	433	5,139	5,057	5,453	5,198
Cadets and Midshipmen	343		343	348	4,115		4,113	4,172

Even though the composite standard military rates are used in the EOB reports, and while this may be correct for budgeting purposes, it is inappropriate to use these pay rates to determine the cost of medical care. The more appropriate method is to use billet costs. This has been explicitly recognized by the Chief of Naval Personnel in the publication, *Navy Military Manpower Billet Cost Data for Life-Cycle Planning Purposes* (NAVPERS 15163) dated July 1973. The introductory paragraph, referring to life-cycle costs, states: "The Chief of Naval Personnel has developed the data in this publication for use in computing the life-cycle costs for major Navy weapon systems (ships, aircraft, etc.) . . . . In addition, they are used for many other management purposes, wherever the projected costs of military manpower are significant." The Navy medical system certainly meets these criteria as more than 50 percent of the operating budget dollars are used to pay military personnel salaries.

The concept behind manpower billet costs is to include the total cost to the U.S. government of manning an established operational billet. The major difference from the composite standard military pay rates is the recognition that there are non-operational times which are known as "down" costs. "Manpower billet costs, as defined by the DOD Manpower Cost Model Study Group, include the total cost to the U.S. government of manning an established operational military billet, or a military billet that would be established within a proposed system. These costs are presented as annual costs for both officer and enlisted personnel and are used in costing the life-cycle of the system under consideration. Manpower billet costs differ significantly from appropriation-oriented personnel costs which are used for budget planning purposes, since they contain values that are not taken into account in appropriation-oriented costs. For example, the values established within the formula for the purpose of costing the 'down time' of personnel in service schools, and the values developed to reflect the effect of 'continuance rates' are not contained in personnel cost data used for budget planning purposes"[5].

The composite standard military rate is the appropriate charge to make for manpower only in the very shortest run analysis. The time frame must be so short that none of the costs associated with procurement and training are marginal. The restrictions require that all personnel are in place and will not undergo further training, be replaced, or be rotated to another activity. It is doubtful that the time frame implied by these restrictions would be even 24 hours. Billet costs are more appropriate for long-run analysis–the analysis appropriate for management decision. It recognizes that there are periods during military service in which the personnel will not be operational. Yet during these non-operational periods there will be significant cost to the government whether the personnel be in a student status, in transit, or whatever. The most appropriate way to recognize these costs is by amortizing them, as a billet cost model does.

For the purposes of comparison we have included Table 4-6 which shows the annual billet cost by pay rate for the enlisted ranks E2 through E9. The significance of the differences between the standard military rates and the billet cost data are shown on Table 4-7. For enlisted ranks the billet cost exceeds the standard military rates by 61 percent to 91 percent.

Billet costs are also calculated specifically for the hospital corpsmen. These rates have been included as Table 4-8. They are substantially above the annual billet costs for the average of all NEC's. This is expected due to the high level of investment in a corpsman's medical skills. Also shown on Table 4-8 in parenthesis below the billet cost is the percentage difference between it and the

TABLE 4-6

PAY GRADE COST DATA

Pay Grade	E-2	E-3	E-4	E-5	E-6	E-7	E-8	E-9
Annual Billet Cost by Pay Grade	9,938	10,089	12,014	14,587	18,157	20,477	23,087	28,990
Average Time in Years to Advance to the Pay Grade	0.3	0.8	2.2	3.2	9.2	13.9	17.1	21.0
Median Length of Service	0.8	1.6	2.9	6.9	13.6	16.8	19.0	23.5

TABLE 4-7

COMPARISON: COMPOSITE RATE, BILLET COST

Grade	E-2	E-3	E-4	E-5	E-6	E-7	E-8	E-9
Composite Rate	5,757	6,253	7,132	8,261	10,120	11,650	13,323	15,178
Billet Cost	9,938	10,089	12,014	14,587	18,157	20,477	23,477	28,990
Billet Cost Composite Rate %	173%	161%	168%	177%	179%	176%	173%	191%

Source: *Navy Military Manpower Billet Cost Data for Life-Cycle Planning Purposes,* (NAVPERS 15163), July 1973.

TABLE 4-8

ANNUAL ENLISTED MANPOWER BILLET COSTS FOR LIFE-CYCLE PLANNING
(1973)

RATING	E-2	E-3	E-4	E-5	E-6	E-7	E-8	E-9
HOSPITAL CORPSMAN								
HM	11,587	14,091	17,308	18,744	24,206	27,669	31,101	37,868
% of Composite Rate	(202)	(225)	(245)	(227)	(239)	(237)	(233)	(249)
HOSPITAL CORPSMAN–PRESSURIZED WATER OPERATOR/MAINTENANCEMAN								
HMA	11,414	14,031	18,257	19,688	24,121	27,601	31,031	37,796
% of Composite Rate	(199)	(224)	(256)	(238)	(238)	(237)	(233)	(249)
HOSPITAL CORPSMAN–SUBMARINE TRAINED								
HMS	12,305	14,993	18,457	19,965	26,077	29,727	33,236	40,202
% of Composite Rate	(213)	(240)	(259)	(242)	(259)	(255)	(249)	(265)
HOSPITAL CORPSMAN–NUCLEAR-POWERED SUBMARINE								
HMX	12,247	14,694	17,947	19,455	25,552	29,202	32,711	39,675
% of Composite Rate	(212)	(235)	(252)	(236)	(252)	(251)	(245)	(262)

Source: *Navy Military Manpower Billet Cost Data for Life-Cycle Planning Purposes,* (NAVPERS 15163), July 1973.

composite rate which the EOB report employs. Corpsmen billet costs are more than twice the composite standard military rates for the same pay grades.

Billet costs have also been calculated for officers and included in the same publication. However, staff officers who generally receive their initial professional training outside the Navy such as the medical corps and dental corps are specifically excluded from the model. These staff officers, however, do receive some investment during internship and residency and other downtimes, and the high rate of turnover would lead one to expect a high billet cost. This is as there is only a short period of time in which to amortize any investment in these persons' skills. However, billet costs would be reduced to the degree that a portion of the professional training does occur prior to military service. A weak comparison can be made by comparing the annual officer manpower billet costs for all other officers, not including surface line officer, submarine officers, or aviation officers with the composite standard military rate. Table 4-9 shows the billet costs for such officers. The same significant relationship occurs; the billet cost is approximately $10,000 greater than the composite standard military rate. If this relation holds for the medical corps (and the nurse corps) then the entire cost of military medicine has been significantly underreported. Adjustments are required.

We have made initial efforts to estimate life-cycle cost in the medical corps. Many of the inputs are those that have been justified in the *Navy Military Manpower Billet Cost Data for Life-Cycle Planning Purposes*. The scenario that we evaluated was that of a physician who entered the medical corps upon completion of a civilian internship. Those who continue to serve enter a three-year residency program at the third year. This, in fact, is characteristic of the medical corps, although there are a few physicians who enter after their residency training and others who enter as interns. The results of our initial analysis are included in Table 4-10. It is evident that the longer the physician remains in the service, the greater the investment made and hence the higher the billet cost relative to the composite rate. If a weighted average is taken based on the composition of the medical corps by pay grade weighted by their salaries, we find that the billet cost exceeds the composite rate by 58 percent. Evidently there is significant underreporting of the military labor expense in the EOB financial data.

4.3 Capital Adjustments

Few government enterprises account for capital using methods similar to those used in the private sector. The first difference is that the government does not depreciate its capital assets over their useful life. Apparently this results because businesses exist to earn a profit for their owners while the government does not. In order that the long-run profitability of a firm be recognized, the short-run fluctuations due to the timing of capital expenditures must be smoothed. The method by which this is accomplished is by depreciating the capital asset over its useful life. Since the government's purpose is not to profit, but rather to provide services to the public, they have not found it worthwhile to monitor depreciated values. Instead their accounting systems have been designed to prevent fraud and misappropriation of capital expenditures.

TABLE 4-9

ANNUAL OFFICER MANPOWER BILLET COSTS
FOR LIFE-CYCLE PLANNING [1]

DESIGNATOR	O-1	O-2	O-3	O-4	O-5	O-6
ALL OTHER OFFICERS[1] EDO, LDO, SUPPLY						
OX	20,142	25,590	30,345	36,061	42,239	57,208
% of Composite Rate	(196)	(192)	(178)	(164)	(175)	(198)
ALL OTHER OFFICERS[1] EDO LDO, SUPPLY–SUBMARINE TRAINED						
OXS	23,798	29,799	37,667	42,679	47,692	63,346
% of Composite Rate	(232)	(223)	(221)	(211)	(198)	(219)

[1] These costs do not include Staff Corps who generally receive their initial professional training outside the Navy, such as Medical, Dental, Civil Engineering, JAG, and Chaplain Corps Officers.

Source: *Navy Military Manpower Billet Cost Data for Life-Cycle Planning Purposes,* NAVPERS 15163, July 1973.

TABLE 4-10

PRELIMINARY ESTIMATES
BILLET COST MEDICAL CORPS, USN

	O-3	O-4	O-5	O-6
% of Corps	51	31	9	9
Billet Cost	$22,734	$32,651	$51,272	$61,926
Composite Rate	17,056	20,170	24,146	28,876
Billet Cost as % of Composite Rate	133%	162%	212%	214%

Weighted Average Billet Cost/Composite Rate 158%

The second primary difference is that the government does not charge itself a rate of interest, or the opportunity cost of using capital. This probably results because government expenditures are financed through the Treasury Department. Other budgetary functions only see the cash flows that result from Congressional appropriations and, as they don't finance the flow of funds, many ignore their opportunity cost. Private firms cannot afford to do so whether the funds are owned by the entrepreneurs, are borrowed from banks, or are accumulated through the issue of stocks and bonds. The interest charges must be paid; they should be a part of the calculation of government expense also.

More specifically, we may refer to HEW's *Provider Reimbursement Manual* [9]. It contains the guidelines that hospitals must use to justify the cost of payments to be made by the government due to obligations incurred by beneficiaries under Medicare, Medicaid, and CHAMPUS. We will discuss only those portions of the manual that refer to depreciation, interest expense, and return on equity. Chapter One deals with depreciation; it begins: "The principles of reimbursement for provider cost provide that payment for services should include depreciation on all depreciable type assets that are used to provide covered services to the beneficiaries." Depreciable assets include the buildings, the building equipment, major movable equipment, minor equipment, and land and leasehold improvements. In short, the government requires that the providers distribute the cost of tangible capital assets over the estimated useful life of each unit.

The government also allows interest expense: "Necessary and proper interest on both current and capital indebtedness is an allowable cost. . . . Interest is the cost incurred for the use of borrowed funds generally paid at fixed intervals by the user. Interest on current indebtedness is the cost incurred for funds borrowed for relatively short terms usually for one year or less. . . . Interest on capital indebtedness is the cost incurred for funds borrowed for capital purposes such as the acquisition of facilities, equipment, and capital improvements." The government also recognizes finance charges, i.e., those expenses incurred in securing a loan or floating a bond issue.

Finally, for proprietary providers, the government recognizes a return on equity capital: "An allowance of a reasonable return on equity capital invested and used as a provision of patient care is allowable as an element of the reasonable cost of covered services furnished to the beneficiaries by proprietary providers. The amount allowable on an annual basis is determined by applying to the provider's equity capital a percentage equal to one and one half times the average of the rates of interest on special issues of public debt obligations issued to the Federal Hospital Insurance Trust Fund for each of the months during the provider's reporting period, or portion thereof covered under the program." We contacted the Bureau of Health Insurance in Seattle and found that during the past several months the rate of interest allowable under the above definition has varied between 9.75 percent and 9.9 percent. The future rates are uncertain, of course, but will probably lie within or above this range for some time to come. The equity capital includes both the plant, property, and equipment that is related to patient care, as well as the net working capital that is required for day-to-day operations. It should be noted that hospitals are predominantly nonproprietary and thus would not qualify for charging patients for this return to equity. However, as discussed above, both depreciation and interest expense are recognizable costs.

The Expense Operating Budget does not include the normal capital charges that we have been discussing above. Assets that were purchased in the past are not depreciated in the current year, nor is there any interest expense due to the different method of funding. In fact, we have been unable to find an adequate data source or methodology that would enable us to complete calculations to allocate these capital expenses. However, there are two sources that perhaps can provide an indication of the magnitude of capital expenses. Under "other receipts" hospitals are required to report major capital expenditures as well as the common support that they receive in any fiscal year to the Bureau of Medicine and Surgery. Hence, they provide an estimate of the current expenditures on capital equipment. The second possibility is the Plant Valuation Report, which records for each activity the purchased value of land, buildings and improvements, and equipment as of 30 June 1972.

BuMed provided us with the reports from each of the activities reporting "other receipts" for the years 1969-1972. We have summarized that data and included it here as Table 4-11. It includes the reported amount of common support and capital expenditures (both directly for the hospital as well as to support medical personnel, such as barracks) for each year as well as the four-year total for each activity. (Many of the entries are incomplete because the reports for those activities and for those years were not to be found within the files given us.) It is apparent that there have been wide fluctuations in the annual expenditures and among the amounts expended in each activity. It appears that the years 1969 to 1971 were lean years in terms of investment while 1972 expenditures more than doubled over the previous three-year average. In some part, this is probably the result of the Navy gearing up for the all-volunteer force. Judging from the Five Year Defense Plan, this surge in investment will continue into the future. Under appropriate assumptions the expenditures reported as "other receipts" can be regarded as a proxy for the depreciation expense reported by civilian hospitals. The required assumption is that the system is in equilibrium in terms of its capital expenditures. That is, if we can assume that the Navy is just replacing equipment that has served its useful life, then current capital expenditures would be equal to the sum of the depreciation upon assets purchased in the past. However, if due to the budgetary crunch the Navy was not even maintaining its medical structures and equipment, the receipts would underestimate the depreciation expense. We would speculate that the latter case has been closer to the truth.

Due to the missing data elements, we have included Table 4-12 analyzing the "other receipts." It shows the average annual expense for those years for which the activity filed a report. For example, Bethesda only filed reports for two of the four years; their total average was derived by dividing by two. Similarly Beaufort's average is based upon three years data and Annapolis' on four years. The sum of the weighted averages is $9,327,257.

The second report referred to above was the Plant Valuation Report, 30 June 1972, the relevant portions of which have been included here as Table 4-13. It shows the value of assets in five categories: land; buildings and improvements; equipment non-IPE; and equipment indust. prod., as well as the total for each of the Naval hospitals and medical centers. As the land and capital equipment is valued at acquisition cost, if it was given to the Navy it is valued at zero. Transfers within the Navy are not costed either. For example, at Whidbey Island the line command has provided the land and the building to BuMed for the hospital. There has been no rental charge nor have the asset values been allocated. To the extent that this occurs, there is significant underreporting of the capital assets used to provide medical care in the Navy. However, these assets

TABLE 4-13

PLANT VALUATION REPORT
30 JUNE 1972

ACTIVITY	UIC	LAND	BUILDINGS & IMPROVEMENTS	EQUIPMENT NON-IPE	EQUIPMENT INDUST. PROD.	TOTAL
Annapolis	00162	5,578	2,095,766	523,265	0	2,624,609
Beaufort	61337	62,783	10,414,414	832,983	1,095	11,311,275
Boston	00112	19,846	6,606,677	2,100,639	5,788	8,732,950
Bremerton	00254	149,103	3,515,253	877,503	15,364	4,557,223
Camp Lejeune	00416	6,185	7,812,675	1,278,458	2,791	9,100,109
Camp Pendleton	60285	25,667	4,583,133	1,246,878	2,611	5,858,289
Charleston	00199	29,739	4,177,423	1,283,455	0	5,490,617
Cherry Point	66094	0	0	428,200	0	428,200
Corpus Christi	00285	62,681	2,663,646	614,750	45,219	3,386,296
Great Lakes	00211	144,580	22,419,746	2,520,623	1,265	25,086,214
Jacksonville	00232	10	10,022,279	1,592,478	4,720	11,619,487
Key West	00267	45,081	2,138,762	475,559	0	2,659,402
Lemoore	66095	0	0	332,947	0	332,947
Long Beach	64211	19	8,343,213	1,533,353	0	9,876,585
Memphis	60002	6,187	7,049,108	1,514,810	1,516	8,571,621
Newport	00119	116,816	3,736,595	938,110	0	4,791,521
Oakland	00619	262,039	23,386,146	3,773,937	69,636	27,491,758
Orlando	65492	0	1,732,079	798,573	7,800	2,538,452
Patuxent River	66098	0	0	280,131	0	280,131
Philadelphia	00154	328,717	9,794,885	3,325,276	8,517	13,457,395
Port Hueneme	66099	0	0	300,052	5,500	305,552
Portsmouth, NH	00105	77,472	1,640,470	511,197	22,468	2,251,607
Quantico	00231	21,349	2,621,295	424,106	0	3,066,750
Quonset Point	66100	0	0	366,137	0	366,137
St. Albans	60008	564,800	25,574,993	2,758,986	13,801	28,912,580
San Diego	00259	4,077	17,569,958	5,397,880	0	22,971,915
Whidbey Island	66097	0	0	151,062	0	151,062
TOTAL U.S. HOSPITALS		1,932,729	177,898,516	36,181,348	208,091	216,220,684
Bethesda	00163	349,689	36,065,482	11,532,590	170,743	48,118,504
New London	61726	0	0	447,299	6,136	453,435
Pensacola	00203	204	6,404,959	3,286,446	589,152	10,280,761
Portsmouth, VA	66818	127,586	28,524,716	4,482,358	0	33,134,660
TOTAL MEDICAL CENTERS		447,479	70,995,157	19,748,693	766,031	91,987,360
Guam	00352	58,724	21,266,978	1,159,345	4,316	22,489,363
Guantanamo Bay	61564	0	3,077,087	285,155	0	3,362,242
Naples	66096	0	0	288,624	1,152	289,776
Roosevelt Roads	65428	0	0	333,285	0	333,285
Rota	66101	0	1,323,828	223,885	0	1,547,713
Subic Bay	65491	0	3,072,665	430,753	0	3,503,418
Taipei	66102	0	448,586	271,289	0	719,875
Yokosuka	62499	0	426,774	1,017,120	5,326	1,449,220
TOTAL OVERSEAS HOSPITALS		58,724	29,615,918	4,009,456	10,794	33,694,892
Total Worldwide Hospitals		2,468,932	278,509,591	59,939,497	948,916	341,993,936

are not depreciated either and as such the purchase price may overestimate worth of the asset. We could only speculate as to the magnitude of these two effects.

We have allocated interest expenses based on these asset values in Table 4-13 by charging an interest rate on the entire value of these assets. SECNAV Instruction 7000.14 indicates that: "a 10 percent rate is considered to be the most representative point within the range of plausible rates at the present time." Although that instruction explicitly considers discount rates, it also implies that this is the appropriate rate of interest to charge for the use of capital in current years. This would yield an interest expense of $34,199,393.

The above analysis has provided some indication of the magnitude of capital charges that have not been reported by Naval hospitals. The discussion has been limited by the paucity of data generated by the management information system and the government's method of accounts. To see that these magnitudes are not out of line with actual projected capital expenses, we asked BuMed to provide us with their projected future levels. That data has been included here as Table 4-14. Clearly capital expenses will be ongoing—at even greater magnitudes.

4.4 The Problem of Extended Care

Navy medicine is charged with a more extended task than its civilian counterpart. It not only cares for acutely ill patients, it must also rehabilitate military personnel and allow them to convalesce until they can endure the rigors of active duty. Generally in the civilian sector this extended care occurs in the home or in skilled nursing homes. Its cost is far less than that of the acute care that is rendered in civilian hospitals; therefore, it is misleading to compare cost per occupied bed day in military facilities, which include both acute and extended care, with those in civilian hospitals, which are predominantly occupied by acute patients.

A more appropriate comparison can be made if the number of days of extended care can be identified and if comparable costs can be determined from the civilian sector. We first examine the extended care in the Naval medical hospitals and then present a range of price estimates from the civilian sector for extended care. The unit cost cannot be determined precisely, however, as extended care is not a homogeneous product but rather a mix of services. As this mix and the intensity of care varies, then so will the cost. However, we will attempt to present the range of price estimates as well as define the product as narrowly as possible. Of course, our purpose is to price comparable care in the civilian sector. We do anticipate some debate as to what is comparable, but hope that our presentation will enable those who choose to disagree with our conclusions to draw their own, based on the data included here.

While aggregate statistics readily show that active duty personnel remain as patients in military hospitals much longer than their civilian counterparts stay in civilian hospitals, no definitive measure is available to identify how much of this additional length of stay is extended care. In large part this difficulty arises because the practice of medicine is not designed to treat only one disease, but rather all of the maladies which afflict mankind. Therefore, there is not a single product but a diversity of products that must be identified. Each has specific characteristics and will respond differently to different intensities of inputs. Additionally, the progress of a disease is influenced by many other factors, among them sex and age, as well as socioeconomic variables, all of which are

TABLE 4-14

MILCON

Year	Expenditures ($ M) Inpatient	Outpatient	Total
1972	15.1	7.4	22.5
1973	30.8	13.4	44.2
1974	51.5	47.3	98.8
1975	57.9	63.1	121.0
1976	141.0	26.1	167.1
1977	129.1	7.0	136.1
1978	104.9	0	104.9
1979	100.0	0	100.0

OPN

Year	Expenditures
1972	—
1973	6.9
1974	8.4
1975	9.2
1976	15.0
1977	12.8
1978	7.0
1979	7.0

beyond the control of a physician. This increases the complexity of the product even further. Even beyond this, there is a random element in the treatment of most diseases. Therefore, one must be somewhat skeptical of comparisons between statistics that are based on aggregate data. Of course, the more narrowly the product can be identified, i.e., the more variables that can be held constant, the more confidence can be placed in the estimates.

The first problem alluded to above is that which results due to the different resource requirements to treat the varying diseases that require hospitalization. When comparing aggregate averages without verifying that the same case mix occurs in the two aggregates, one can never be sure whether differences in the mean result from different periods of time to treat the same disease or because the two aggregates do not have the same composition of diseases that are treated. Even if the two means of the aggregates are identical, one cannot be sure that these effects do not occur. This problem can be circumvented to some degree by using more narrowly defined disease categories. Generally in the civilian sector, the categorization adopted is that of the *International Classification of Diseases Adapted for Use in the United States* (ICDA) [10]. These codes were promulgated by the United States Department of Health, Education, and Welfare. The military reporting system uses the classifications contained in the Department of Defense Disease and Injury Codes (DDDIC) [8] which is modeled after an earlier version of the International Classification of Diseases. Comparisons can be made between statistics reported under these two methods of classification.

Both the ICDA and the DDDIC have broadly classified diseases into 18 categories. These are identified by the Roman numerals and included in Table 4-15. Following the nomenclature are the more specific ICDA codes which identify the diagnoses that are included in these broad categories. Also included as a part of Table 4-15 is the average length of stay for each of these categories from the four data bases that we have been able to identify. The first column shows the average length of stay by these diagnostic categories for all CHAMPUS beneficiaries for calendar year 1972. The next column contains data for the Kaiser-Permanente Medical Care System in Portland, Oregon, for both their hospital and the attached extended care facility. The data contained in the column headed PAS was derived from the discharge records of over 11 million patients from 1,476 hospitals in the United States and Canada for 1971. The Navy statistics for active duty personnel cared for in military hospitals have been represented in two columns; the first records the average number of census days per patient and the second is an estimate of the average number of occupied bed days of patients in military hospitals.

The CHAMPUS data is based on annual report M734 calendar year 1972, which includes all data that had been processed through 30 April 1973. These statistics are based on the claims filed by all beneficiaries. Approximately 60 percent of these claims were for active duty dependents, ten percent were for retired personnel, and 30 percent were for the dependents of retired or deceased personnel. Both short-term and long-term care medical institutions are included here, as can readily be seen by category V, Mental, Psychoneurotic and Personality Disorders, which shows an average length of stay of 49.6 days. This stay is much longer than that reported by any of the other sources of data, primarily because CHAMPUS accepts these claims for inpatient psychiatric care while the other programs attempt to limit it. With that diagnostic category included, the overall average length of stay for all beneficiaries in 1972 was 8.8 days. Removal of that category would result in an average length of stay for the remaining 17 groups of 5.5 days.

TABLE 4-15

AVERAGE LENGTH OF STAY BY DIAGNOSTIC CATEGORY

		ICDA	CHAMPUS (ALL BENEFICIARIES)	K-P OREGON (1)	K-P OREGON (2)	PAS	NAVY (1)	NAVY (2)
I	Infective & parasitic diseases	0-136	5.9	5.6	9.0	6.7	18.3	16.1
II	Neoplasms	140-239	7.7	6.5	9.0	10.6	27.9	24.5
III	Allergic, endocrine system, metabolic & nutritional diseases	240-279	7.8	4.5	5.8	10.4	23.6	20.7
IV	Diseases of blood & blood-forming organs	280-289	6.3	5.5	6.0	8.04	23.0	20.2
V	Mental, psychoneurotic & personality disorders	290-315	49.6	3.1	4.3	11.8	27.2	23.9
VI	Diseases of nervous system & sense organs	320-389	6.8	4.7	6.1	6.5	24.1	21.1
VII	Diseases of the circulatory system	390-458	10.0	6.0	9.0	12.8	25.4	22.3
VIII	Diseases of the respiratory system	460-519	4.1	3.2	4.0	5.4	11.0	9.7
IX	Diseases of the digestive system	520-577	6.5	4.9	5.4	11.3	18.7	16.4
X	Diseases of the genito-urinary system	580-629	5.1	6.6	8.2	6.4	13.3	11.7
XI	Deliveries & complications of pregnancy, childbirth, & puerperium	630-678	3.5	3.4	3.4	3.7	25.3	22.2
XII	Diseases of the skin & cellular tissue	680-709	5.1	5.2	6.2	7.4	12.1	10.6
XIII	Diseases of the bones & organs of movement	710-738	8.3	4.7	6.9	9.8	29.9	26.2
XIV	Congenital malformations	740-759	10.0	4.8	5.1	6.5	17.3	15.2
XV	Certain diseases of early infancy	760-779	11.2	5.5	5.5	16.8	33.1	29.0
XVI	Symptoms, senility, & ill-defined conditions	780-796	6.1	3.9	4.4	6.5	12.1	10.6
XVII	Injuries & adverse effects of chemical & other external causes	800-999	5.4	5.0	6.5	8.8	33.5	29.4
	Other		2.8	3.1	5.2	—	19.3	16.9
	Weighted Average		8.8	4.6	5.6	7.7	22.6	19.8
	Weighted Average excluding Category V		5.5				22.6	19.5

There are two columns under the heading Kaiser-Permanente, Oregon. This data is a result of an experiment which occurred in 1968 [12]. The Bess Kaiser Hospital in Portland had constructed an attached extended care facility (ECF). The purpose of the experiment was to determine what effect this would have on the length of stay of those using the hospital. As a by-product of that experiment, the investigators recorded the number of hospital discharges and number of days spent in the hospital and the ECF by diagnostic category. Column 1 under the heading KP-Oregon is the average length of stay in the hospital. Column 2 is the sum of the number of days in the hospital plus the number of days in the ECF, divided by the number of hospital discharges. It should be noted that since not all of those discharged from the hospital were admitted to the ECF, the average length of stay in the extended care facility is not the difference between these two columns. The population served are those enrolled in the HMO. The statistics are for non-Medicare users only. As can be seen by comparison with the CHAMPUS data, there are some differences of the length of stay. These may be explained by a number of reasons, among them the different philosophy of care and economic incentives between prepayment and fee-for-service plans, the different characteristics of the population served, a different case mix, and the random incidence of diseases. As can be seen from the totals, the overall average length of stay is 5.6 days, including both the hospital and the ECF care. This is quite close to the adjusted CHAMPUS figure of 5.5 days; however, as mentioned above, there are significant differences within the composition of this weighted average.

The Commission of Professional and Hospital Activities has established a computer audit of patient discharge records. Participating hospitals code the clinical records which are then submitted to PAS, processed, and the statistics generated returned to each hospital. They also compute national averages which were published in *Length of Stay in PAS Hospitals, United States, 1971* [6]. The statistics included therein are the basis for data presented under column heading PAS.

As can be seen from Table 4-15, the average length of stay for all categories, except newborns for PAS hospitals was 7.7 days. In general, the average length of stay for each category is longer than those reported by either of the other civilian data sources. We can only conjecture about the reasons for this, but perhaps some of the causes are those that we speculated caused the difference between the CHAMPUS and the KP-Oregon data. Additionally, the CHAMPUS fiscal administrators may make a more intensive review and exert tighter controls to prevent extended stays in acute-care hospitals.

The final two columns report the average length of stay for active-duty Navy and Marine Corps personnel discharged from the sick list during the period July-December 1969. It was provided by the Navy Medical Data Service Bureau and is the most current information available. The disease categories employed are those of the DDDIC. The same broad classifications are employed by the DDDIC as those used by ICDA. However the days reported in the statistical tables are not "occupied bed days" but rather "sick days."

The difference between these two statistics is that "occupied bed days" reflects the length of stay in hospitals and "sick days" is based on the hospital census or the number of days a patient is not available for his regular assignment. We investigated the difference between these two classifications by comparing the average length of stay based on "occupied bed days" and based on "sick days." Using the data reported in *Statistics of Navy Medicine* [3], we calculated that the average length of stay in terms of "occupied bed days" was 19.8 for the first two quarters of FY 1970. The average

length of stay in terms of "sick days" for that same period was 22.6 or approximately 14 percent greater. We inquired of the Naval Medical Data Center if there was any way to identify what proportion of the "sick days" were "occupied bed days." There is not. The only remaining possibility was to reduce the "sick days" by the 14 percent by which they were greater than "occupied bed days." Of course, inherent in this methodology is the assumption that the amount by which "sick days" exceeds "occupied bed days" is proportional to the length of stay and independent of the diagnostic category. The length of stay, according to "sick days," is reported in column 1 under Navy and the adjusted length of stay is reported in column 2.

Casual perusal of the table indicates a significant difference in the average length of stay between the military hospitals and each of the civilian data sources. The length of stays are uniformly longer in the Naval hospitals. On average, military personnel stayed 2.3 times as long as a CHAMPUS beneficiary, 3.5 times as long as those enrolled in the Kaiser-Permanente Medical System in Oregon, and 2.6 times as long as the stays reported by PAS. If adjustment of the CHAMPUS data is made to delete psychiatric care and the same adjustment is allowed by the Navy data, then active duty military personnel stayed 3.5 times as long as the CHAMPUS beneficiaries. In order to derive a categorical comparison, Table 4-16 was generated by dividing the average length of stay reported by each of the civilian data bases into the adjusted Navy length of stay. The one outlier in the table is for Category V. The reason for it has been discussed elsewhere. Clearly, there is a significant difference in the philosophy of care and the type of care itself between Navy and civilian hospitals.

The above discussion does not deal with all of the problems that were mentioned earlier. Certainly these diagnostic categories are not just one disease, nor do their components have similar average length of stay or variance. The different population characteristics have not been dealt with at all. Nor has it been specified whether these were simple or complex diagnoses. The effects of some of these variables are illustrated by Table 4-17, the PAS summary of all patients in diagnosis groups, except newborn. From the data displayed there, one can see the effects of age, of multiple diagnosis, and requirements for surgical operations. In general the average length of stay and the variance increase with age, with multiple diagnosis, and with the requirements for operations. Also shown in Table 4-17 are the total number of patients in each category (the sample size) and the distribution of the length of stay by the 5th, 10th, 50th, 75th, 90th, 95th, and 99th percentile. Unfortunately, a sex distribution is not shown.

In order to more narrowly define the products of comparison, we have attempted to control some of these additional parameters by which the average length of stay was tabulated for PAS hospitals. Since single diagnoses have a smaller variance than the multiple diagnoses, we have eliminated complicated cases from our comparison. We have also assumed that Navy personnel are predominately in the age group 20-49, and have computed the average stay for this age group from PAS to compare with the Navy. Where operations seem to have been a relevant variable, we have specified that length of stay separately and taken a weighted average of both the operated and non-operated group. Finally, we have more narrowly defined the diagnoses according to the limits imposed by the PAS reports. In other words, we have controlled as many of the factors as possible with the existing data sources. The results of these comparisons are included in this report as Appendix A. This comparison appears to validate that the difference in the aggregate average length of stay between our data sources does not result due to a differing case mix, but rather is primarily a result of the different lengths of time Naval personnel and their civilian counterparts are treated

TABLE 4-16

RATIO OF LENGTH OF STAY–NAVY OBD*/CIVILIAN OBD

			CHAMPUS	K-P	PAS
I	Infective & parasitic diseases	0-136	2.7	2.3	2.4
II	Neoplasms	140-239			
III	Allergic, endocrine system, metabolic & nutritional diseases	240-279	2.7	3.6	2.0
IV	Diseases of blood & blood-forming organs	280-289	3.2	3.4	2.5
V	Mental, psychoneurotic & personality disorders	290-315	.5	5.6	2.0
VI	Diseases of nervous system & sense organs	320-389	3.1	3.5	3.2
VII	Diseases of the circulatory system	390-458	2.2	2.5	1.7
VIII	Diseases of the respiratory system	460-519	2.4	2.4	1.8
IX	Diseases of the digestive system	520-577	2.5	3.0	1.5
X	Diseases of the genito-urinary system	580-629	2.6	1.6	2.1
XI	Deliveries & complications of pregnancy, childbirth, & puerperium	630-678	6.3	6.5	6.0
XII	Diseases of the skin & cellular tissue	680-709	2.1	1.7	1.4
XIII	Diseases of the bones & organs of movement	710-738	3.2	3.8	2.7
XIV	Congenital malformations	740-759	1.5	3.0	2.3
XV	Certain diseases of early infancy	760-779	2.6	5.3	1.7
XVI	Symptoms, senility, & ill-defined conditions	780-796	1.7	2.4	1.6
XVII	Injuries & adverse effects of chemical & other external causes	800-999	5.4	4.5	3.3
	Total		2.3	3.5	2.6
	Excluding Category V		3.5		

*"Sick days" adjusted to estimate occupied bed days.

TABLE 4-17

SUMMARY OF ALL PATIENTS IN DIAGNOSIS GROUPS EXCEPT NEWBORN

	TOTAL PATIENTS (2)	AVG. STAY (3)	VARI-ANCE (4)	PERCENTILES 5th (5)	10th (6)	50th (7)	75th (8)	90th (9)	95th (10)	99th (11)
1. SINGLE DX										
A. *Not Operated*										
0-19 YRS	541410	4.6	25	1	1	3	5	8	12	26
20-34	857609	4.2	18	1	1	4	5	6	10	22
35-49	286417	6.7	46	1	2	5	8	14	19	34
50-64	221425	8.2	63	1	2	6	10	18	23	39
65+	166786	10.2	94	2	2	7	13	21	28	52
B. *Operated*										
0-19 YRS	666101	3.3	18	1	1	2	4	6	9	20
20-34	663141	4.6	19	1	1	3	6	9	11	22
35-49	447019	6.1	36	1	2	4	8	13	17	29
50-64	358258	7.6	53	1	2	6	10	16	21	36
65+	233364	10.2	88	2	2	7	13	21	28	48
2. MULTIPLE DX										
A. *Not Operated*										
0-19 YRS	320232	5.8	39	1	1	4	7	11	15	33
20-34	307380	6.3	43	1	2	4	7	12	17	34
35-49	336300	8.6	60	2	2	6	11	17	23	39
50-64	509444	10.4	78	2	3	8	13	21	27	45
65+	772721	12.7	110	3	4	10	16	25	33	56
B. *Operated*										
0-19 YRS	276403	5.5	67	1	1	3	6	12	19	47
20-34	460785	6.9	55	1	2	5	8	13	18	42
35-49	452200	9.2	77	2	2	7	11	18	25	48
50-64	428845	12.1	126	2	2	9	15	25	34	62
65+	404535	16.4	183	3	4	13	21	34	44	75
SUBTOTALS										
1. SINGLE DX										
A. *Not Operated*	2073647	5.6	38	1	1	4	6	11	16	32
B. *Operated*	2367883	5.5	38	1	1	4	7	12	16	31
2. MULTIPLE DX										
A. *Not Operated*	2246077	9.7	83	2	2	7	12	20	27	47
B. *Operated*	2022768	10.2	116	1	2	7	13	22	31	59
1. SINGLE DX	4441530	5.5	38	1	1	4	6	11	16	31
2. MULTIPLE DX	4268845	9.9	99	1	2	7	12	21	29	53
A. NOT OPERATED	4319724	7.7	66	1	2	5	9	17	23	41
B. OPERATED	4390651	7.7	80	1	2	5	9	17	24	47
TOTAL 0-19 YRS	1804146	4.5	32	1	1	3	5	9	12	30
" 20-34	2288915	5.2	30	1	2	4	6	9	13	29
" 35-49	1521936	7.7	57	1	2	6	10	16	21	38
" 50-64	1517972	9.9	86	2	2	7	13	21	27	48
" 65+	1577406	13.0	129	2	3	10	17	27	35	61
GRAND TOTAL	8710375	7.7	73	1	2	5	9	17	24	44

Source: *Length of Stay in PAS Hospitals*, 1971

for similar diagnoses. Judging from the overall aggregates, it appears that Naval and Marine Corps personnel spend from 2.5 to 3.5 times as long in military hospitals than civilians do in the private-sector hospitals.

We have been able to make still further comparisons between the average length of stay of active duty personnel and those beneficiary groups receiving inpatient care through CHAMPUS. The source of the CHAMPUS data is report M734 for the fiscal year 1972. The comparisons (also contained in Appendix A) are between the average length of stay for each beneficiary group, using the average number of "sick days." In some ways this comparison is superior to that between the PAS data base and the military due to the fact that the disease categories are more narrowly defined. However, the comparison is inferior to the PAS system in that the cases included both single and complex diagnoses and we have been unable to make any age/sex adjustment that is not implied by the beneficiary categories into which the data points falls. However, the indication that was established previously receives more substantiation from the comparisons contained here. The average length of stay of military personnel is generally significantly longer than the length of care of those who receive benefits under CHAMPUS. There are minor exceptions to this general rule; however, they are special cases and none are serious enough to invalidate it.

Extended care is clearly a major portion of military medicine. Its exact extent may be subject to debate; however, it is inconceivable that any would deny that it is a significant factor. To estimate the cost of this extended care we turned to the civilian sector. We investigated a considerable number of data sources. The detailed analysis is contained in Appendix B.

The price estimates are summarized in Table 4-18. The minimum cost we found for extended care was generated by the survey commissioned by the Social Security Administration which shows that proprietary non-ECF's in 1969 charged an average $9.11 per day. The maximum charge recorded was for the Kaiser-Permanente ECF in 1968. That charge was $39.08 per day. The most current data, for 1972 and 1973, has provided price ranges from $12.56 to $31.00 per day. In large part this variance is the result of differing intensities of care. This is most explicitly shown by the Veteran's Administration data for the nine months, July 1972 to March 1973. The VA provides an estimate for the cost of skilled nursing home care that does lie within the range of the data reported by Hospital Administrative Services. Domiciliaries and VA nursing bed care fall outside of the range. Since extended care provided in Navy hospitals is a mix of the services that would be provided by these three types of institutions, the cost to be allocated should be a weighted average. We have used $20.

4.5 Method of Adjustment

The requirement for modification of the reported measures of input and output has been substantiated above. The inability of the current management information systems to make these adjustments has also been discussed. While realizing their limitation, we have derived our best estimates using the computer algorithm to execute the methodology described below.

We modify the EOB resource cost and output activity data in three ways: first we increase reported military salaries by a constant percent at each of the medical activities; then we allocate capital expenses (both "other receipts" and the constant percent of plant value) to the operating expense

TABLE 4-18

THE RANGE OF PRICE ESTIMATES FOR EXTENDED CARE
(SEE APPENDIX B)

Social Security Administration (1969)	$11.83
Proprietary ECF	13.42
Non-ECF	9.11
Nonproprietary ECF	14.51
Non-ECF	9.87
Hospital Administrative Services (1972)	
Within Hospital	$15.78
Separate Building	18.99
Free Standing	15.09
Proprietary	20.93
Kaiser-Permanente Oregon (1968)	$39.08
Veteran's Administration (1972-73)	
Domiciliaries	$12.56
Nursing Bed	31.00
Skilled Nursing Home	16.93

on inpatient and outpatient cost centers; and finally, we adjust the output indicator "occupied bed days" reported for the active duty population to provide a more accurate index of the intensity of care required.

The first adjustment is that which is required to reflect the true cost of the military labor inputs used to produce medical care. This is required because the composite rate has been used to price manpower, and while it is a good measure of the average benefit package that active duty personnel receive, it fails because no special consideration has been given to the medical corps' bonuses, nor have costs that are neither wages nor fringe benefits been included—training, transportation, procurement, and nonproductive time. The adjustment, however, is not straightforward. The EOB report Q08 which allocates costs to inpatient and outpatient cost centers does not separately identify military salaries from civilian salaries. Additionally, since only the net adjustments between cost centers are reported, it is impossible to tell what proportion of the salaries has been costed against the net total expenses of inpatient or outpatient care. Faced with these difficulties we have made the following assumptions: First, from the EOB report we have identified the amount of military salaries and civilian salaries initially allocated to inpatient, outpatient, and unallocated cost centers for the second quarter FY 1973. Second, we have assumed that the adjustments between cost centers would not significantly alter these proportions nor would they alter the percent of net total cost that results from the salary component. Finally, we have assumed that to reflect the full cost, military salaries must be increased by 75 percent. This adjustment has been made for the cost centers that reflect inpatient activity, outpatient activity, unallocated expenses, and of course the total expense.

The second adjustment required is to reflect capital expense. The EOB does not include any capital expense (whether it is OPN dollars or MILCON dollars) if the item costs more than $1,000 or a group of items more than $1,500. However, each medical activity reports these "other receipts". Also available from BuMed is the plant valuation report which tabulates the acquisition cost of land, plant, and equipment for each activity. The model allocates the average of the past four years' reported "other receipts" and 10 percent of the plant value to the operating expense of the medical activity. This allocation is made only to inpatient and outpatient cost centers in proportion to their net total expenses for the first six months of FY 1973.

The final adjustment required is that to the activity indicator for inpatient care. Currently the output indicator is the "occupied bed days." Extremely broad classes of care are counted equally by this unit. For example, care in an intensive care unit or coronary care unit is classified identically to that of an orthopedic patient with a walking cast in his thirtieth day in the hospital. Of course, this also occurs to some extent in the civilian sector and, in fact, with all indicators that attempt to summarize diverse information into a few significant numbers. A correction is required here because the bias of the indicator is so severe that the numbers are no longer meaningful. It is assumed that the intensive care must diminish with length of stay. In order to correct this measure, we have allowed only the first 10 days of average length of stay to be considered as acute care. The remainder is counted as extended care. We have specified the cost of extended care as $20. After deducting the total cost of extended care, the remainder is considered to be the total cost of acute care. In fact this is conservative. Consider the following example: two active duty members who enter the hospital, one with a relatively minor aliment requiring but three days on inpatient status and the second with a somewhat more serious problem necessitating an extended convalescent

period. Assume this second individual remained in the hospital for 17 days, whereas in the civilian sector he would have been an inpatient for only 10 days. Since our adjustment for extended stay would be based on the average for the two cases it would be determined that there would be no extended care whatsoever; the average length of stay for these two individuals was ten days. However, in fact there was a seven-day convalescent period.

4.6 Adjusted Cost and Activity Data

The results of the adjustments described above are reported in Tables 4-19, 4-20 and 4-21. Table 4-19 reports the inpatient statistics by UIC for acute and rehabilitative care. There are still some hospitals that are reporting erroneous data as there were in the initial EOB statistics. However, even with these hospitals the adjusted cost of an inpatient day including professional services is $154. These costs vary to the extreme across the hospital. This is not unexpected as there are many variables which have not been included. For example, the size of the hospital is an important determinant of the unit cost. Additionally, the sophistication of care is also an important variable. However, it is not possible to deny that some of this variation could be explained as a difference in efficiency between these hospitals.

Similar comments apply to the outpatient statistics reported in Table 4-20. The data is not wholly reliable. However, not all of the variance in the unit costs can be so simply explained. We would speculate that, among other things, the remainder would be a function of the population served, the definition used for an outpatient visit, the allocation of costs between inpatient and outpatient cost centers, and economic efficiency. The size of the medical region would probably exert less of an influence here than for inpatient care. Table 4-20 reports the average cost of an outpatient visit to be $14.85. Again, this weighted average includes all activities reporting, and thus some erroneous data. Exclusion of the obviously bad data points would raise this average.

TABLE 4-19

INPATIENT STATISTICS

(FY 73, Q1 + Q2)

UIC	CONT. CARE OBD	REHAB OBD	C C O BED	REHAB O BED	REHAB COST	C C COST	UNIT COST REHAB	UNIT COST CONT. CARE
00105	8366	344	52	3	6880	1562674	20	186
00112	28539	16387	190	110	327740	5198582	20	182
00154	97284	25604	633	167	512080	11587494	20	119
00162	5954	0	55	0	0	1388306	0	233
00168	0	0	0	0	0	1945145	0	0
00203	0	0	0	0	0	120050	0	0
00211	54223	14952	344	96	299040	8290560	20	152
00231	10164	0	75	0	0	1781611	0	175
00254	14274	4375	103	32	87500	2586524	20	181
00267	6530	4270	54	36	85400	1434844	20	219
00285	10754	2996	86	24	59920	2238301	20	208
00352	20817	0	125	0	0	4281980	0	205
00416	37570	16712	263	117	334240	4949530	20	131
00619	49330	39498	341	274	789960	11454559	20	232
0498A	62723	26172	416	174	523440	10303965	20	164
0499A	20480	8679	133	57	173580	2375326	20	115
0608A	0	0	0	0	0	941423	0	0
0619A	0	0	0	0	0	367680	0	0
0620A	0	0	0	0	0	0	0	0
0621A	0	0	0	0	0	188	0	0
0622A	0	0	0	0	0	149176	0	0
0751A	0	0	0	0	0	112779	0	0
60002	15608	7334	115	55	146680	3491138	20	223
60008	20225	20288	124	126	405760	6718198	20	332
60285	29601	12575	235	100	251500	5052864	20	170
61337	14266	9088	97	63	181760	2696020	20	188
61564	5886	0	50	0	0	1336497	0	227
61726	6616	4499	47	33	89980	1090587	20	164
62499	7912	2951	65	25	59020	1905850	20	240
64211	35301	30949	239	211	618980	5180178	20	146
65428	7427	1604	57	13	32000	132802	20	17
65491	18583	0	125	0	0	1401994	0	75
65492	39214	0	180	0	0	3432922	0	87
66095	5391	493	45	5	9860	896684	20	166
66096	11456	1201	72	8	24020	1332310	20	116
66098	3635	0	30	0	0	895826	0	246
66099	6738	952	48	7	19040	989959	20	146
66101	6251	54	49	1	1080	744331	20	119
66102	5706	435	46	4	8700	914273	20	160
66818	84583	60066	555	395	1201320	10670237	20	126
68056	118904	88941	809	606	1778820	14609505	20	122
68084	28731	11092	259	101	221840	4133650	20	143
68085	29079	15080	217	113	301600	4992140	20	171
68086	21826	13157	155	95	263140	956783	20	43
TOTAL	949947	440748	6489	3051	8814960	146645445	0	154

TABLE 4-20

OUTPATIENT STATISTICS

(FY 73, Q1 + Q2)

UIC	OPU	TOTAL COST	UNIT COST
00105	28578	588927	20
00112	53464	1796211	33
00154	81376	1332503	16
00162	37721	691667	18
00168	0	7895	0
00203	0	247098	0
00211	217848	3409520	15
00231	57823	815288	14
00254	150361	1023899	13
00267	41155	745203	18
00285	36871	935768	25
00352	74610	1398924	18
00416	257228	2681945	10
00619	144365	2729210	18
0498A	199457	4715627	23
0499A	186579	652786	3
0608A	0	0	0
0619A	0	0	0
0620A	0	0	0
0621A	0	0	0
0622A	0	0	0
0751A	0	241524	0
60002	94960	2093269	22
60008	53993	1158175	21
60285	163880	2332816	14
61337	84487	1164874	13
61564	28444	259288	9
61726	80491	973300	12
62499	33736	933542	27
64211	194920	3347288	17
65428	35448	51719	1
65491	32551	681555	20
65492	172770	2306905	13
66095	36393	547904	15
66096	40486	396055	9
66098	41227	437696	10
66099	56799	648675	11
66101	36103	425858	11
66102	23251	542793	23
66818	544620	8161319	14
68056	680405	10141454	14
68084	144573	1590013	10
68085	206392	3339624	16
68086	159851	523190	3
TOTAL	4514216	67071307	14

TABLE 4-21

EXPENSE SUMMARY

(FY 73, Q1 + Q2)

(1) UIC	(2) INPATIENT	(3) OUTPATIENT	(4) UNALLOCATED	(5) TOTAL	(6) (4)/(5)
00105	1569554	588927	82185	2240666	3
00112	5526322	1796211	1339323	8661856	15
00154	12099574	1332503	1279384	14711461	8
00162	1388306	691667	142492	2222465	6
00168	1945145	7895	569847	2522887	22
00203	120050	247098	-128881	238267	-54
00211	8589600	3409520	838600	12837720	6
00231	1781611	815288	72963	2669862	2
00254	2674024	2023899	269288	4967211	5
00267	1520244	745203	126283	2391730	5
00285	2298221	935768	206451	3440440	6
00352	4281980	1398924	150028	5830932	2
00416	5283770	2681945	563135	8528850	6
00619	12244519	2729210	2910901	17884630	16
0498A	10827405	4715627	2043204	17586236	11
0499A	2548906	652786	85718	3287410	2
0608A	941423	0	338265	1279688	26
0619A	367680	0	1040453	1408133	73
0620A	0	0	1776080	1776080	100
0621A	188	0	2011413	2011601	99
0622A	149176	0	149384	298560	50
0751A	112779	241524	356601	710904	50
60002	3637818	2093269	118734	5849821	2
60008	7123958	1158175	604958	8887091	6
60285	5304364	2332816	113330	7750510	1
61337	2877780	1164874	276664	4319318	6
61564	1336497	259288	31892	1627677	1
61726	1180567	973300	520111	2673978	19
62499	1964870	933542	267110	3165522	8
64211	5799158	3347288	874353	10020799	8
65428	164882	51719	-4036	212565	-1
65491	1401994	681555	5338	2088887	0
65492	3432922	2306905	79788	5819615	1
66095	906544	547904	151186	1605634	9
66096	1356330	396055	-34238	1718147	-1
66098	895826	437696	46936	1380458	3
66099	1008999	648675	87939	1745613	5
66101	745411	425858	46251	1217520	3
66102	922973	542793	143484	1609250	8
66818	11871557	8161319	3175744	23208620	13
68056	16388325	10141454	2383253	28913032	8
68084	4355490	1590013	576461	6521964	8
68085	5293740	3339624	615404	9248768	6
68086	1219923	523190	17065	1760178	0
TOTAL	155460405	67071307	26320844	248852556	10

5.0 APPLYING THE RESULTS

In the previous chapter we described how to better estimate the cost of providing medical services in military health care facilities. Initially, we presented financial and output indicators as reported. Next, we substantiated the need for repricing military labor using the billet cost methodology, for fully allocating the cost of capital, and for explicitly taking account of convalescent as well as acute care provided on an inpatient basis. That chapter concluded with new estimates of the cost of providing both inpatient and outpatient services. However, it is inappropriate to use these average costs to calculate the change in cost that would occur if the scale of operations were altered. The correct procedure is to use the marginal cost of providing another unit of service. This chapter explains how we determined those marginal costs, not only for the military, but also for CHAMPUS. Both the theoretical justification as well as the empirical estimates will be included here. The chapter concludes with the cost implications of various scenarios.

While many people have recognized that the marginal costs should be the relevant price to use in altering the source of inpatient care, most have couched their arguments in terms of the marginal costs of occupied bed days. This is an inappropriate measure for two reasons: once the capacity of the hospital has been determined and it is staffed and equipped, empirical analysis indicates that the total expenses do not fluctuate significantly with the number of occupied bed days, i.e., the marginal cost is close to zero. But this analysis has not allowed the capacity of the medical facility to change. The second deficiency is that the number of occupied bed days is not a decision variable. In fact, it can only be envisioned as such if one is willing to argue that patients should be admitted on the basis of the availability of space rather than the requirements of their medical conditions. Therefore, the use of "cost per occupied bed day" as a decision variable confuses the issue in that it is not a control variable. It is not the occupied bed days that should be adjusted to the size of the facility but the facility size adjusted to the number of occupied bed days required by the medical condition of the population served.

In the long run it is the marginal cost of changes in the capacity of the hospital that should be calculated. Fortunately, BuMed not only budgets the expense of its medical facilities, it also authorizes their capacity in terms of the number of operating beds that they may use and staff. It is this marginal cost that is relevant. If segments of the civilian population were to be provided care under CHAMPUS rather than in military hospitals, then the capacity of the latter would be altered. The analysis is still not straightforward, however, in that military hospitals not only provide acute care but also convalescent care, primarily for the active duty personnel. Since the civilian beneficiaries receive their care in the acute operating beds, it is essential to calculate the costs of an acute operating bed. The data to support this analysis was provided in Chapter 4 by determining both the total cost and the number of operating beds that provide continuous care.

It should be recognized that this analysis of marginal cost will not provide a production function of inpatient services. We have made no statement of efficiency and have not attributed any of the marginal product to a specific input. We have not evaluated any of the trade-offs that may occur in substitution of capital for labor or between any of the other inputs. Rather, we are providing an analysis of the budget function of BuMed. It is they who have allocated these budgets explicitly in terms of the operations and maintenance budget and implicitly in terms of the allocations of military billets and capital resources. This analysis describes how they do it.

Similar reasoning to that expressed above applies to outpatient care. However, we have been unable to identify a measure of the capacity similar to the number of operating beds. In fact, due to the method of allocation adopted by the military, it is less necessary to do so. The only price for outpatient care is a time price. In effect, the queue has been allowed to ration these services. The physician has less control over the level of services he will deliver in the clinic than he does for inpatient care. Inpatient care is only delivered once the physician has made the decision to admit the patient. For outpatient care, the patient only has to show up at the dispensary and wait in line and he will see a physician. Therefore, it is more appropriate to assume that outpatient clinics are operating at capacity, and the number of outpatients visits that they deliver becomes a measure of that capacity. This is the assumption we have used. Our site visits validated the assumption.

The sample we used was the financial activity data for the first two quarters of FY 1973. This implies that our results will be based on cross-sectional analysis rather than time series data. Consistent time series data is nonexistent. Additionally, not all of the data points reported in Chapter 4 can be counted here. Certainly those teaching and research activities that report no workload activity data cannot be included. Additionally, there are some data problems resulting from the reporting procedure of some activities. For this reason, the following six output-producing medical activities have been eliminated: Great Lakes (00211), Pensacola (0499A), Roosevelt Roads (65428), Orlando (65492), Charleston (65084), and Newport (68086). Pensacola, Roosevelt Roads, Charleston and Newport were deleted from the sample because they only reported three months financial data. Great Lakes and Orlando were deleted because they reported inpatient activity provided at dispensaries but did not allocate any of the dispensary costs to inpatient cost centers. San Diego and Beaufort had problems similar to Great Lakes and Orlando, but we were able to adjust that data so that it is suitable for inclusion in the sample. There is one problem that we have not been able to correct for but we have not excluded the sample data points. Three of the hospitals–Camp Lejeune, Newport, and Bremerton–report not only their own financial and activity data but also those of other hospitals–Cherry Point, Quonset Point, and Whidbey Island. Newport has been excluded from the sample for other reasons. However, both Bremerton and Camp Lejeune remain in the sample. This is a misspecification of the model; however, our estimates of the marginal cost have not been substantially impacted.

5.1 Results of Linear Regression Analysis

Using the data described and the models as specified above, the following estimates have been derived:

$ Acute Inpatient Care = $642,897 + $18,984 * (no. of acute operating beds)

Source	SS	DF	MS	F
Regression	0.8922839D 15	2	0.4461420D 15	0.2355150D 03
Residuals	0.5493543D 14	29	0.1894325D 13	
Total	0.9472194D 15	31		R^2 = .88

$ Outpatient Care = $170,622 + $14.71 * (no. of outpatient visits)

Source	SS	DF	MS	F
Regression	0.2523802D 15	2	0.1261901D 15	0.5268809D 03
Residuals	0.6706112D 13	28	0.2395040D 12	
Total	0.2590863D 15	30		$R^2 = .95$

For inpatient care the marginal cost of authorizing an additional acute operating bed is estimated to be $18,984. The inpatient fixed cost was estimated to be $642,689. For outpatient care the marginal cost of an additional outpatient visit is $14.71; the fixed cost is $170,622. Care should be taken in interpreting these estimates as they are for a six-month period. For the inpatient equation the dimensions of the fixed costs are dollars per six months and the dimensions of the variable costs are dollars per authorized acute operating bed per six-month period. The dimensions for the coefficient of outpatient visits, the marginal cost, is dollars per outpatient visit and the dimensions of outpatient visits is outpatient visits per six-month period. As one can tell from the summary statistics, both of these equations do a good job of estimating the costs throughout the relevant range. For inpatient care the value of the multiple correlation coefficient (R^2) is .88. This indicates that 88 percent of the variance of the total expense was explained by the regression equation. For the estimate of the cost of outpatient care, the value of R^2 was .95. In both cases the F value indicates that the results are extremely significant. Experimentation has been tried with other specifications of the model to explain the expenses, but none have performed better than these.

These results are displayed on Figures 5-1 and 5-2. While there are some outlying data points, and there is certainly some variation we have not explained, these models do remarkedly well. Certainly there are variables which we have not included which do impact on cost. However, apparently we have identified the most significant ones.

For inpatient care, the fixed cost in this analysis is then the intercept on the dollar axis of Figure 5-1—.65M. It should be interpreted as the total expense of a hospital without operating beds or doctors. The marginal costs, or the change in total cost when the number of operating beds is changed is shown by the slope—or about $19,000 per operating bed.

To this point only economic considerations have been discussed. There are also policy considerations, primarily those dictated by the military preparedness requirements. Suppose that the total capacity of the hospital as measured by operating beds is 350. Of these 100 are being used to provide inpatient care for active duty personnel, the remainder being used by the civilian beneficiaries. Finally, in addition to the peacetime demands of active duty, the contingency plans require that at this hospital 200 beds be available to provide care to satisfy active duty demands in the event of war. These additional 100 beds would have to be authorized and staffed regardless of whether or not they were used to provide medical care; therefore the marginal cost for providing care to civilians is approximately equal to zero. Policy decisions have dictated that the cost of operating a 100-bed hospital be fixed.

Our marginal cost calculations are still relevant for those beds which are authorized beyond the 200 required by military preparedness. Using Figure 5-3 we can see what has happened.

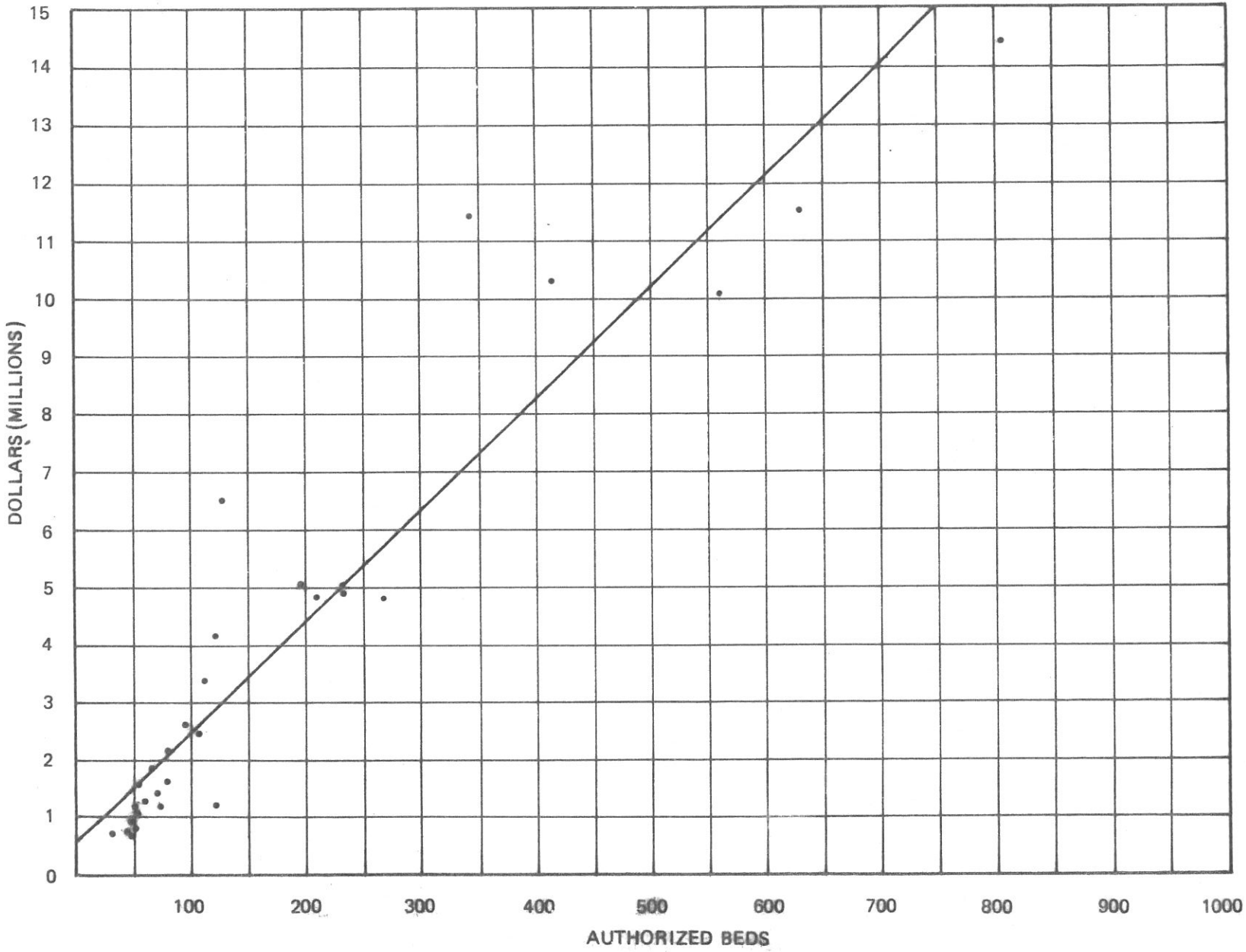


FIGURE 5-1 ACUTE INPATIENT CARE

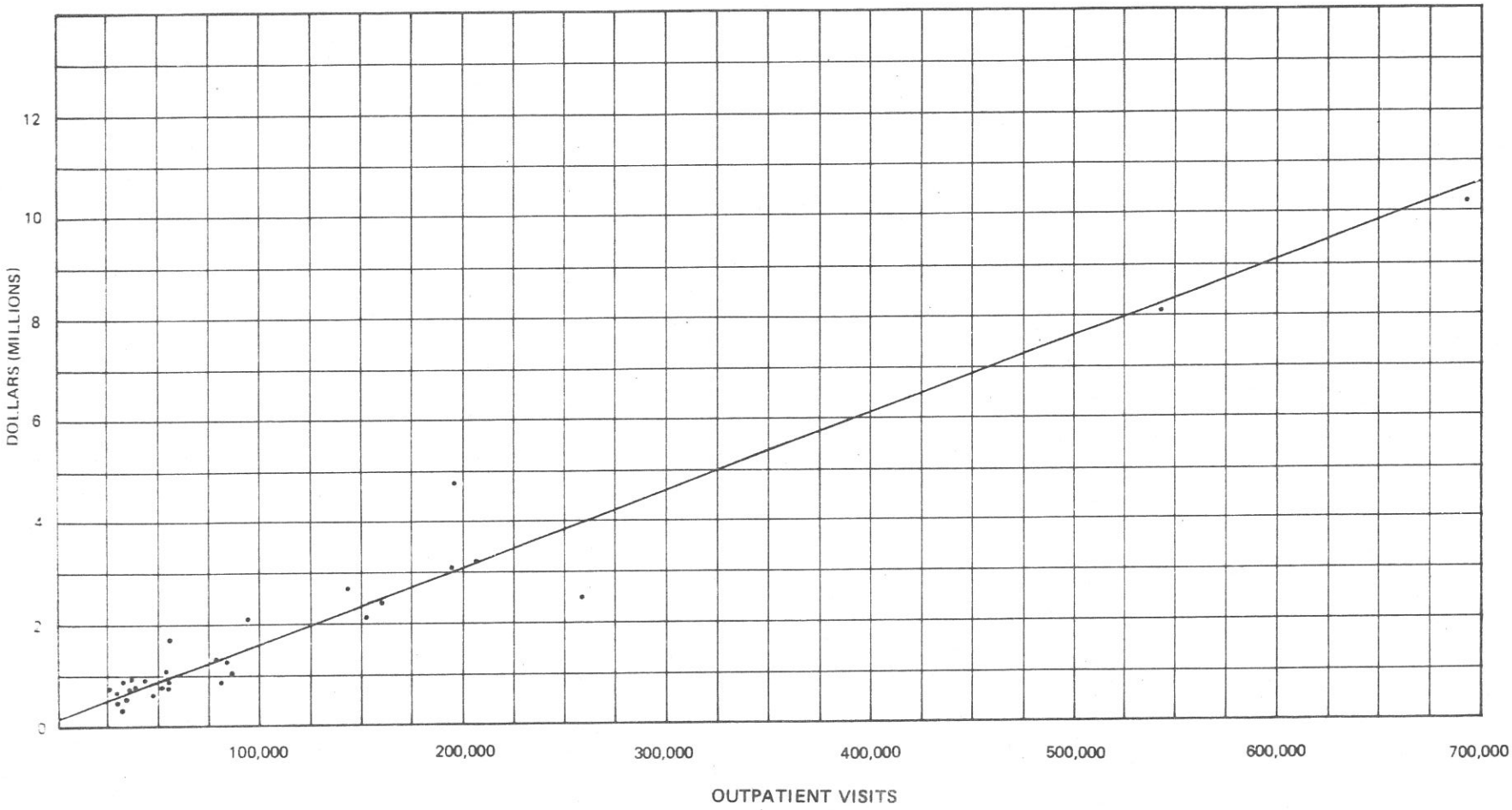


FIGURE 5-2 OUTPATIENT CARE

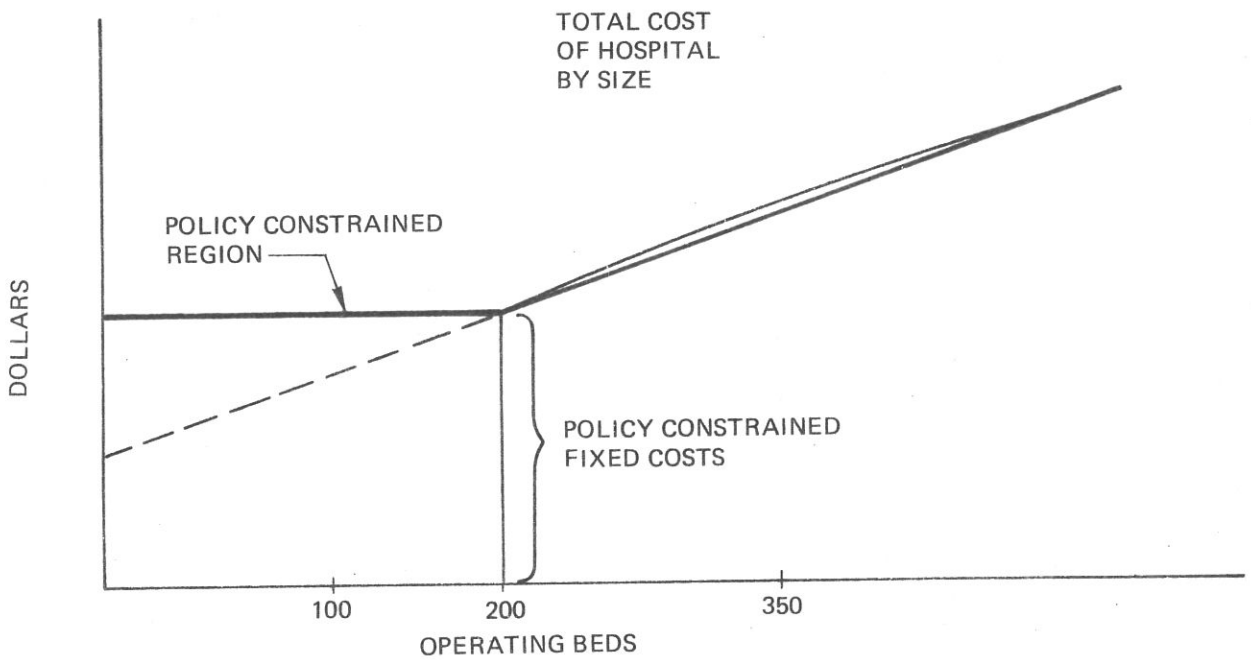


FIGURE 5-3 MARGINAL COST – INPATIENT CARE

The minimum size of the hospital is no longer zero operating beds, but rather 200 beds. The fixed costs are much larger at this level of operation, and the marginal cost of caring for civilians is approximately zero in the range 100 to 200. But, beyond 200 beds, the costs rise as before when only the economics of the situation was considered and the slope of the curve is unchanged.

A similar discussion is appropriate for the considerations of outpatient care. We are currently unaware of the mission requirements for medical resources, but are investigating this point further.

We have also calculated marginal cost estimates that include an AVF bonus of $15,000 for each physician. Under those circumstances, the billet cost of the medical corps would be in excess of twice the composite rate. The other major component of the expense for military labor is for hospital corpsmen, whose billet cost was also more than 200 percent of the composite rate. Hence there would be ample justification to assume that in this environment the expense for military labor should be twice that which is required.

The results of these marginal cost calculations are:

$ Acute Inpatient Care = $806,092 + $20,502 * (no. acute operating beds)

Source	SS	DF	MS	F
Regression	0.1055279D 16	2	0.5276393D 15	0.2698178D 03
Residuals	0.5475509D 14	28	0.1955539D 13	
Total	0.1110034D 16	30		$R^2 = .89$

$ Outpatient Care = $197,344 + $16.32 * (no. of outpatient visits)

Source	SS	DF	MS	F
Regression	0.3118105D 15	2	0.1559053D 15	0.5482754D 03
Residuals	0.7961960D 13	28	0.2843557D 12	
Total	0.3197725D 15	30		$R^2 = .96$

They should be interpreted as above.

5.2 Marginal Cost of CHAMPUS Care

The government purchases services from the civilian sector through CHAMPUS. The marginal cost to the government of this service is simply the price they pay. We can assume that this will continue to be the marginal cost to the government if the additional demand on the civilian sector would not increase the price of care. We have assumed that it would not, based on the following analysis: in 1972 in the United States the total payment for health care was $67 billion [11]. Even if all the civilian beneficiaries were denied access to military health care facilities, we anticipate that the increased expenditures through CHAMPUS for Navy beneficiaries would be less than 0.2 percent of this total. This is apparently an insignificant increase in demand. Of course, there may be some geographic regions in which the increased demand is concentrated and the assumption would hold less well. However, we doubt it would be completely invalidated. The second reason for anticipating that the cost of care would not rise is that BuMed would release resources to the civilian sector if its size were reduced. These resources would tend to increase supply and help dampen the effects of any increased demand. Therefore, it seems appropriate to assume that the marginal costs would continue to be equal to the price of CHAMPUS care. The prices that should be used are discussed below.

CHAMPUS is the alternate source of care to that which is provided in the military facilities for the dependents of active duty personnel, the retired personnel, and the dependents of the retired and deceased personnel. In fact, for illnesses such as mental disorders, CHAMPUS is the only source of care for the civilian beneficiary population. The Naval medical facilities are not geared to provide such long-term care and as a result provide it to only the active duty population. Even this group does not have services comparable to those available in the civilian sector because, once it is established that the mental disorder will prevent the individual from returning to active duty, he is discharged and thereafter receives benefits under the Veteran's Administration.

Since some of the scenarios that we wish to evaluate include both the reduction in scale of operation of the military facilities as well as the increased cost of CHAMPUS care, it is essential that prices for similar types of care under CHAMPUS be derived. To do this on a case-by-case basis is impossible due to the current state of the information systems, and in any case, the information would be more expensive than it would be worth. However, since the primary type of care available under CHAMPUS but not in the Navy facilities is psychotherapy, we simply derive CHAMPUS prices exclusive of this component.

Some data used in our pricing of CHAMPUS care will be from calendar year 1972. In part, this is because they are the only data that are available to us giving the appropriate breakout. Therefore, in our comparisons of CHAMPUS prices with the cost of Navy medical treatments, while there is a six-month overlap, there are also some data points that occur in the initial months of 1972. To the extent that inflation raised the average cost of care between the first six months of calendar year 1972 and the last six months, our estimates will be too low. We do not think that this problem introduces substantial error.

5.2.1 Inpatient Care

OCHAMPUS has supplied us with Annual Report M739D which reports the inpatient hospital and physician costs for the Navy and Marine Corps beneficiary population for calendar year 1972. That report has been included here as Table 5-1. For the three classes of beneficiaries that can avail themselves of the CHAMPUS program, the types of care are reported under the following categories: delivery, medical-neuropsychiatric, medical other, surgical-dental, and total. As can be seen for dependents of active duty personnel and those of the retired and deceased personnel, while the cost per day for medical NP is low, the case cost is extremely high. This results because the average length of stay in mental institutions is up to ten times that which is required for the other types of care. Since the Navy does not provide this type of care in their medical facilities, it is doubtful that by altering their scale of operation one would increase the CHAMPUS load for medical NP. Therefore, it is reasonable to eliminate it from consideration in determining the anticipated price of CHAMPUS inpatient care. We have made this calculation based on the data in Table 5-1 and have summarized it for the three beneficiary groups in Table 5-2. For active duty dependents the government's cost per case falls from $820 to $714. The patient's share declines from $30 to $27. For the retired population the impact is less significant. The difference is that their average length of stay for medical NP is 18.5 days, significantly less than that reported for the dependents of active duty of 43.9 days. In fact, the government's share of the case cost rises from $749 to $755. The patient's share increases from $484 to $525. However, the change in costs for the dependents of the retired and deceased personnel follows a similar pattern to that of the active duty dependents. That is, the government's share in the case costs falls from $729 to $625. The patient's share drops from $389 to $351. Again this results due to the average length of stay for medical NP of 50.1 days.

The second adjustment required so that the case cost will reflect the total Navy expense is inclusion of the cost of processing the claims filed for payment. OSD (H & E) has provided us with this cost data for the 12 months ending December 31, 1972. The mean cost per claim for all those financial intermediaries reporting was $5.92. By multiplying this cost per claim times the number of claims, the full cost of inpatient care can be determined. This calculation is shown in Table 5-2 with the resulting total case costs. The cost per admission to the government for the beneficiaries is: Dependents of Active Duty–$732; Retired Personnel–$774; and Dependents of Retired and Deceased Personnel–$643.

5.2.2 Outpatient Care

For the same reasons that have been discussed above, psychotherapy should not be allowed to bias the price of outpatient visits that are not associated with mental disorders. However, the cost of

TABLE 5-1 ANNUAL REPORT M739D INPATIENT HOSPITAL AND PHYSICIAN COSTS (INCLUDING DENTAL) FOR CALENDAR YEAR 1972 BY CATEGORY OF BENEFICIARY AND TYPE OF CARE
BRANCH OF SERVICE – NAVY

PROCESSED THROUGH
APRIL 30, 1973

PATIENT STATUS	TYPE OF CARE		NUMBER OF CLAIMS	COST TO GOVERNMENT	COST TO PATIENT	AVERAGE COST PER ADMISSION GOVT	AVERAGE COST PER ADMISSION PAT	AVERAGE COST PER PATNT DAY GOVT	AVERAGE COST PER PATNT DAY PAT	ADMISSION DATA TOTAL ADM	ADMISSION DATA NUMBR DISGD	TOTAL HOSPITL DAYS	AVG LGTH STAY
DEP RED	DELIVRY	HOSP	2,298	802,418.96	335,437.40	350.55	146.54	87.06	36.39	2,289	2,297	9,217	4.0
		PHYS	3,337	569,079.26	204,810.25	248.61	89.48	61.74	22.22				
		COMB	5,635	1,371,498.22	540,247.65	599.17	236.02	148.80	58.61				
	PED NF	HOSP	6,637	5,560,626.41	2,462,906.83	1465.64	649.16	29.27	12.96	3,794	3,421	189,991	50.1
		PHYS	3,425	830,813.75	328,928.15	218.98	86.70	4.37	1.73				
		COMB	10,062	6,391,440.16	2,791,834.98	1684.62	735.86	33.64	14.69				
	PED OTH	HOSP	15,852	5,511,017.16	3,326,060.18	376.36	227.14	47.06	28.41	14,643	13,047	117,094	8.0
		PHYS	32,868	2,054,351.52	864,644.68	140.30	59.05	17.54	7.38				
		COMB	48,720	7,565,368.68	4,190,704.86	516.65	286.19	64.61	35.79				
	SUR-DEN	HOSP	18,236	7,941,664.05	5,251,904.19	439.01	290.32	72.99	48.27	18,090	18,093	108,805	6.0
		PHYS	34,753	5,031,864.16	2,320,448.78	278.16	128.27	46.25	21.33				
		COMB	52,989	12,973,528.21	7,572,352.97	717.17	418.59	119.24	69.60				
	TOTAL	HOSP	43,023	19,815,726.58	11,376,308.60	510.50	293.08	46.61	26.76	38,816	36,858	425,107	11.0
		PHYS	74,383	8,486,108.69	3,718,831.86	218.62	95.81	19.96	8.75				
		COMB	117,406	28,301,835.27	15,095,140.46	729.13	388.89	66.58	35.51				
ALL ELIG	DELIVRY	HOSP	28,297	12,901,862.35	983,525.71	458.70	34.97	115.77	8.83	28,127	28,267	111,440	4.0
		PHYS	42,513	8,903,104.23	210,686.85	316.53	7.49	79.89	1.89				
		COMB	70,810	21,804,966.58	1,194,212.56	775.23	42.46	195.67	10.72				
	PED NF	HOSP	16,333	16,374,854.67	3,214,208.87	1659.22	325.69	38.67	7.59	9,869	8,884	423,467	42.9
		PHYS	10,993	3,188,153.92	381,400.53	323.05	38.65	7.53	0.90				
		COMB	27,326	19,563,008.59	3,595,609.40	1982.27	364.33	46.20	8.49				
	PED OTH	HOSP	50,335	17,981,009.72	5,795,550.22	382.68	123.34	61.84	19.93	46,987	39,695	290,783	6.2
		PHYS	116,497	6,759,486.27	1,289,072.07	143.86	27.43	23.25	4.43				
		COMB	166,832	24,740,495.99	7,084,622.29	526.54	150.78	85.08	24.36				
	SUR-DEN	HOSP	50,808	25,257,803.41	8,484,108.40	500.78	168.21	92.19	30.97	50,437	50,422	273,986	5.4
		PHYS	94,772	15,229,126.39	3,325,899.51	301.94	65.94	55.58	12.14				
		COMB	145,580	40,486,929.80	11,810,007.91	802.72	234.15	147.77	43.10				
	TOTAL	HOSP	145,773	72,515,530.15	18,477,393.20	535.49	136.45	65.94	16.80	135,420	127,268	1,099,676	8.1
		PHYS	264,775	34,079,870.81	5,207,058.96	251.66	38.45	30.99	4.74				
		COMB	410,548	106,595,400.96	23,684,452.16	787.15	174.90	96.93	21.54				

TABLE 5-1 (CONTINUED)

PATIENT STATUS	TYPE OF CARE		NUMBER OF CLAIMS	COST TO GOVERNMENT	COST TO PATIENT	AVERAGE COST PER ADMISSION GOVT	AVERAGE COST PER ADMISSION PAT	AVERAGE COST PER PATNT DAY GOVT	AVERAGE COST PER PATNT DAY PAT	ADMISSION DATA TOTAL ADM	ADMISSION DATA NUMBR DISGO	TOTAL HOSPITL DAYS	AVG LGTH STAY
DEP ACT	DELIVRY	HOSP	25,991	12,095,374.80	646,640.23	468.27	25.03	118.37	6.33	25,830	25,962	102,181	4.0
		PHYS	39,165	8,332,020.22	5,208.35	322.57	0.20	81.54	0.05				
		COMB	65,156	20,427,395.02	651,848.58	790.84	25.24	199.91	6.38				
	MED NP	HOSP	8,233	10,026,594.94	407,502.24	2103.78	85.50	47.91	1.95	4,766	4,187	209,259	43.9
		PHYS	6,942	2,234,365.88	2,139.69	468.81	0.45	10.68	0.01				
		COMB	15,175	12,260,960.82	409,641.93	2572.59	85.95	58.59	1.96				
	MED OTH	HOSP	27,453	9,636,965.01	546,639.38	373.34	21.18	78.00	4.42	25,813	20,630	123,558	4.8
		PHYS	70,085	3,760,563.17	8,891.10	145.68	0.34	30.44	0.07				
		COMB	97,538	13,397,528.18	555,530.48	519.02	21.52	108.43	4.50				
	SUR-DEN	HOSP	27,851	14,294,396.06	792,586.99	516.49	28.64	114.22	6.33	27,676	27,650	125,151	4.5
		PHYS	51,010	8,531,494.89	123,336.59	308.26	4.46	68.17	0.99				
		COMB	78,861	22,825,890.95	915,923.58	824.75	33.09	182.39	7.32				
	TOTAL	HOSP	89,528	46,053,330.81	2,393,368.84	547.70	28.46	82.22	4.27	84,085	78,429	560,149	6.7
		PHYS	167,202	22,858,444.16	139,575.73	271.85	1.66	40.81	0.25				
		COMB	256,730	68,911,774.97	2,532,944.57	819.55	30.12	123.02	4.52				
RETIREES	DELIVRY	HOSP	8	4,068.59	1,448.08	508.57	181.01	96.87	34.48	8	8	42	5.3
		PHYS	11	2,004.75	668.25	250.59	83.53	47.73	15.91				
		COMB	19	6,073.34	2,116.33	759.17	264.54	144.60	50.39				
	MED NP	HOSP	1,463	787,633.32	343,799.80	601.71	262.64	32.52	14.20	1,309	1,276	24,217	18.5
		PHYS	626	122,974.29	50,332.69	93.95	38.45	5.08	2.08				
		COMB	2,089	910,607.61	394,132.49	695.65	301.09	37.60	16.28				
	MED OTH	HOSP	7,030	2,833,027.55	1,922,850.66	433.78	294.42	56.51	38.36	6,531	6,018	50,131	7.7
		PHYS	13,544	944,571.58	415,536.29	144.63	63.63	18.84	8.29				
		COMB	20,574	3,777,599.13	2,338,386.95	578.41	358.04	75.35	46.65				
	SUR-DEN	HOSP	4,721	3,021,743.30	2,439,617.22	646.92	522.29	75.49	60.94	4,671	4,679	40,030	8.6
		PHYS	9,009	1,665,767.34	882,114.14	356.62	188.85	41.61	22.04				
		COMB	13,730	4,687,510.64	3,321,731.36	1003.53	711.14	117.10	82.98				
	TOTAL	HOSP	13,222	6,646,472.76	4,707,715.76	530.91	376.05	58.09	41.14	12,519	11,981	114,420	9.1
		PHYS	23,190	2,735,317.96	1,348,651.37	218.49	107.73	23.91	11.79				
		COMB	36,412	9,381,790.72	6,056,367.13	749.40	483.77	81.99	52.93				

TABLE 5-2

CHAMPUS PRICES
INPATIENT CARE

Beneficiary	Claims	Admissions	Total Cost		Unit Cost	
			Gov	Pat	Gov	Pat
Dependents						
Including NP	256,730	84,085	68,911,775	2,532,945	820	30
Excluding NP	241,555	79,319	56,650,814	2,123,303	714	27
Cost of Processing Claims 5.92 * 241,555 =			1,430,006 58,080,820		732	
Retired						
Including NP	36,412	12,519	9,381,791	6,056,367	749	484
Excluding NP	34,323	11,210	8,471,183	5,662,235	755	525
Cost of Processing Claims 5.92 * 34,323 =			203,192 8,674,375		774	
Dependents Retired and Deceased						
Including Medical – NP	117,406	38,816	28,301,835	15,095,140	729	389
Excluding Medical – NP	107,344	35,052	21,910,395	12,303,305	625	351
Cost of Processing Claims 5.92 * 107,344 =			635,476 22,545,871		643	

processing claims as well as drug costs should be included. In their financial phaseback report OCHAMPUS does provide the average costs per physician outpatient visit excluding drugs, psychotherapy, care of the handicapped, and dental care. The relevant pages of that report have been included here as Table 5-3. The average cost per visit for the dependents of active duty personnel was $16.48. The comparable cost for the dependents of retired and deceased personnel was $16.69, while the cost per visit to the government of retired members was $16.82. The cost to the patient is not reported in the financial phaseback report. However, we do know that for outpatient care they must pay a minimum of $50 deductible and a co-insurance of 20 percent for the dependents of active duty personnel and 25 percent for the remainder of the beneficiary population.

The financial phaseback also reports the cost of claims for drugs made in the civilian sector (see Table 5-4). Some drugs are also supplied via the military health care system; however, as we have no estimate of their costs, we have made no adjustment. Since those claims are for all visits including psychotherapy, we have determined the cost per visit on the basis of the total number of outpatient visits, as reported in Table 5-5.

Finally, we have allocated the cost of processing the claims for outpatient care and drugs with a methodology identical to that described for inpatient care. We have assumed the cost of processing a claim to be as above $5.92—the cost per inpatient claim. There are no data to support any other allocation. These calculations have been summarized in Table 5-6.

As can be seen by the financial phaseback report, these costs have inflated in spite of the administration's best effort to control prices. As a result, if some segment of the beneficiary population were denied care in military facilities now, we would expect the government to incur greater costs than those which have been reported. However, the period of comparison to the military facilities is the first six months of FY 1973. We would also anticipate that their costs have inflated, especially since they must enter a competitive environment of the all-volunteer force and pay the market wage to their employees. The best comparison available is data from approximately the same time period (the first six months of FY 1973) from both Bethesda Medical Data Center and OCHAMPUS. A ballpark estimate of the changing costs that would be anticipated today under varying scenarios can be derived from a change in cost predicted in the first six months of FY 1973 increased by an inflation factor derived from the medical care price index.

The assumption that the same prices that exist currently for CHAMPUS care would prevail if certain segments of the civilian beneficiary population now receiving care in Navy medical facilities were to receive CHAMPUS care may be invalidated if two conditions do not hold. The first condition is that the age and sex composition of the users of the military medicine be the same as the age and sex composition of the CHAMPUS users, in the same beneficiary group. The second is that the pattern of incidence of disease among the disease categories be similar. While the data is scanty, we can show what does exist. It tends to confirm that both the demographic characteristics as well as the pattern of diseases are similar for the users of CHAMPUS and Navy medical facilities.

Dr. David Whipple of the Naval Postgraduate School at Monterey has supervised a thesis by Lt. Cmdr. James Norton, published initially in September 1973. While we cannot agree that the data supports the conclusions of that thesis, he has collected and tabulated important data from the

TABLE 5-3 PHYSICIAN OUTPATIENT CARE, EXCLUDING DRUGS, PSYCHOTHERAPY, HANDICAPPED AND DENTAL BRANCH OF SERVICE NAVY

PHYSICIAN OUTPATIENT CARE, EXCLUDING DRUGS, PSYCHOTHERAPY, HANDICAPPED AND DENTAL
BRANCH OF SERVICE NAVY — DATE 30 JUNE 73

	CCLES 841214.12100 & 841214.125CC DEPENDENTS OF ACTIVE DUTY AND NATO PERSONNEL					CODE 841214.12200 DEPENDENTS OF RETIRED AND DECEASED MEMBERS INCLUDING TITLE 111				
	VISITS	AVERAGE COST PER VISIT	CLAIMS	AVERAGE COST PER CLAIM	COST	VISITS	AVERAGE COST PER VISIT	CLAIMS	AVERAGE COST PER CLAIM	COST
*MERGED FYS	501,609	10.28	144,222	35.77	5,159,036.27	528,455	9.84	136,819	38.00	5,198,731.30
TOTAL FY 71	127,438	11.20	36,836	38.73	1,426,762.46	314,095	12.79	101,588	39.53	4,016,197.96
JULY 71	2,783	14.99	1,217	34.27	41,707.82	11,066	16.37	4,963	36.50	181,173.01
AUGUST	3,810	17.31	1,564	42.16	65,940.27	13,975	16.10	6,010	37.45	225,045.23
SEPTEMBER	5,003	12.60	1,636	38.55	63,059.69	27,635	16.32	11,303	39.90	450,989.72
OCTOBER	6,818	11.35	1,968	39.32	77,372.52	11,746	12.53	4,031	36.51	147,157.25
NOVEMBER	8,043	11.33	2,257	40.39	91,163.51	26,700	13.76	9,296	39.53	367,470.21
DECEMBER	8,776	11.29	2,471	40.09	99,063.60	35,389	11.83	10,443	40.08	418,533.65
JANUARY 72	10,228	10.30	2,860	36.83	105,323.01	31,602	13.13	11,311	36.69	415,026.67
FEBRUARY	11,165	11.13	3,218	38.60	124,213.89	33,221	13.44	11,678	38.22	446,385.56
MARCH	13,114	10.89	3,741	38.17	142,801.06	37,766	13.54	13,677	37.38	511,310.19
APRIL	14,466	10.42	3,962	38.05	150,739.66	38,668	13.11	12,970	39.09	506,956.50
MAY	17,994	10.89	4,976	39.37	195,890.17	50,524	12.43	16,211	38.74	628,069.41
JUNE	36,181	9.68	7,675	45.64	350,257.98	93,328	9.86	22,166	41.51	920,109.75
TOTAL FY 72	138,381	10.89	37,545	40.15	1,507,533.18	411,620	12.68	134,059	38.92	5,218,227.16
JULY 72	4,508	17.14	2,060	37.51	77,269.54	10,017	16.06	4,104	39.20	160,860.89
AUGUST	7,960	16.66	3,215	41.25	132,603.82	12,420	17.57	5,076	43.00	218,259.50
SEPTEMBER	10,028	17.91	3,963	45.31	179,575.60	14,226	17.26	5,956	41.23	245,582.66
OCTOBER	10,805	18.14	4,670	41.97	195,982.12	17,315	18.35	7,430	42.76	317,714.77
NOVEMBER	12,733	17.25	4,863	45.17	219,646.54	19,030	17.32	7,595	43.39	329,560.59
DECEMBER	16,279	15.60	5,540	45.83	253,885.62	23,157	14.89	7,954	43.36	344,846.14
JANUARY 73	15,996	14.90	5,909	40.33	238,291.88	21,251	16.37	8,492	40.96	347,860.34
FEBRUARY	13,118	17.77	5,281	44.13	233,068.17	18,680	17.90	7,734	43.22	334,297.86
MARCH	14,708	17.48	5,613	45.81	257,156.36	20,115	16.67	8,041	41.70	335,307.12
APRIL	11,679	15.10	3,969	44.43	176,358.98	14,894	15.72	5,329	43.93	234,124.76
MAY	4,306	12.64	1,450	37.53	54,420.33	5,195	14.62	1,926	39.45	75,976.87
JUNE	508	4.69	48	49.60	2,380.94	229	9.40	37	58.16	2,152.01
TOTAL FY 73	122,628	16.49	46,581	43.38	2,020,639.88	176,529	16.69	69,674	42.29	2,946,543.31
GRAND TOTAL	890,056	11.36	265,184	38.14	10,113,971.79	1,430,699	12.15	442,140	39.31	17,379,699.45

*MERGED FYS ARE FY57 THRU FY70

TABLE 5-3 (CONTINUED)

	CODE 841214.12300 RETIRED MEMBERS					CODE 841214.12100, 841214.12500, 841214.12600 AND 841214.12300 TOTALS				
	VISITS	AVERAGE COST PER VISIT	CLAIMS	AVERAGE COST PER CLAIM	COST	VISITS	AVERAGE COST PER VISIT	CLAIMS	AVERAGE COST PER CLAIM	COST
*MERGED FYS	133,149	11.29	37,244	40.36	1,502,995.60	1,163,213	10.20	318,285	37.26	11,860,763.17
TOTAL FY 71	68,575	13.25	23,400	38.84	908,862.10	510,108	12.45	161,824	39.25	6,351,822.54
JULY 71	2,247	16.38	1,129	32.61	36,816.94	16,096	16.13	7,309	35.53	259,597.77
AUGUST	2,883	19.31	1,473	37.79	55,665.44	20,668	16.77	9,047	38.32	346,650.94
SEPTEMBER	5,570	16.66	2,332	39.79	92,794.50	38,208	15.88	15,271	39.74	606,843.91
OCTOBER	2,767	12.76	1,078	32.74	35,294.32	21,331	12.18	7,077	36.71	259,824.09
NOVEMBER	5,479	15.61	2,155	39.69	85,526.03	40,222	13.53	13,708	39.70	544,159.75
DECEMBER	7,468	13.28	2,457	40.36	99,172.08	51,633	11.95	15,371	40.13	616,769.33
JANUARY 72	6,031	15.39	2,622	35.39	92,800.97	47,861	12.81	16,793	36.51	613,150.65
FEBRUARY	6,759	14.80	2,599	38.50	100,054.25	51,145	13.11	17,495	38.33	670,653.70
MARCH	7,925	15.08	3,077	38.83	119,474.38	58,805	13.16	20,495	37.75	773,585.63
APRIL	7,874	15.09	2,993	39.69	118,805.12	61,008	12.73	19,925	38.97	776,501.28
MAY	10,436	14.30	3,825	39.03	149,273.57	78,954	12.33	25,012	38.91	973,233.15
JUNE	20,049	10.62	5,214	40.85	213,006.86	149,558	9.92	35,055	42.32	1,483,374.60
TOTAL FY 72	85,488	14.02	30,954	38.72	1,198,684.46	635,489	12.47	202,558	39.12	7,924,444.60
JULY 72	2,336	19.28	1,236	36.43	45,032.89	16,861	16.79	7,400	38.27	283,163.32
AUGUST	2,926	19.69	1,589	36.26	57,616.43	23,306	17.53	9,880	41.34	408,479.75
SEPTEMBER	3,743	16.26	1,695	35.91	60,865.50	27,997	17.36	11,614	41.85	486,023.76
OCTOBER	4,628	16.60	2,088	36.80	76,830.67	32,748	18.03	14,188	41.62	590,527.56
NOVEMBER	4,594	17.90	2,136	38.51	82,254.86	36,357	17.37	14,594	43.27	631,461.99
DECEMBER	6,671	13.55	2,402	37.64	90,408.15	46,107	14.95	15,896	43.35	689,139.91
JANUARY 73	5,459	16.22	2,491	35.55	88,564.77	42,706	15.80	16,892	39.94	674,716.59
FEBRUARY	4,779	17.36	2,233	37.16	82,984.42	36,577	17.78	15,248	42.65	650,350.45
MARCH	4,792	18.28	2,316	37.83	87,612.03	39,615	17.17	15,970	42.58	680,075.51
APRIL	3,324	16.84	1,485	37.70	55,979.58	29,897	15.60	10,783	43.26	466,463.5[illegible]
MAY	1,207	16.20	537	36.41	19,554.61	10,708	14.00	3,913	38.32	149,951.61
JUNE	28	23.92	12	55.82	669.89	765	6.80	97	53.64	5,202.64
TOTAL FY 73	44,487	16.82	20,220	37.01	748,373.80	343,644	16.63	136,475	41.88	5,715,557.19
GRAND TOTAL	331,699	13.14	111,818	38.98	4,[illegible],915.96	2,052,454	12.01	819,142	38.89	31,852,587.7[illegible]

*MERGED FYS ARE FY57 THRU FY70

TABLE 5-4 COST OF CLAIMS MADE FOR DRUGS

30 JUNE 73

	841214.12100 AND 841214.12500 DEPENDENTS OF ACTIVE DUTY PERSONNEL INCLUDING NATO			841214.12200 DEPENDENTS OF RETIRED OR DECEASED MEMBERS INCLUDING TITLE III			841214.12300 RETIRED MEMBERS			TOTAL	
	PRESCRIPTIONS	CLAIMS	GOVERNMENT COST	PRESCRIPTIONS	CLAIMS	GOVERNMENT COST	PRESCRIPTIONS	CLAIMS	GOVERNMENT COST	CLAIMS	GOVERNMENT COST
*MERGED FYS	166,965	51,191	526,772.12	383,269	79,911	1,273,298.46	147,412	30,736	489,735.60	161,838	2,291,806.18
TOTAL FY 71	62,807	14,265	212,974.32	204,253	36,976	763,636.99	78,560	14,222	293,709.79	65,463	1,270,321.10
JULY 71	803	273	2,760.24	2,294	724	8,377.22	882	278	3,222.04	1,275	14,359.50
AUGUST	1,190	385	4,115.09	4,268	1,223	16,302.76	1,642	471	6,270.36	2,079	26,688.21
SEPTEMBER	1,860	568	6,269.46	7,489	1,728	25,526.34	2,881	665	9,817.93	2,961	41,613.73
OCTOBER	3,212	823	11,207.82	10,344	2,365	39,299.72	3,978	909	15,115.44	4,097	65,622.98
NOVEMBER	3,578	999	12,373.98	13,310	2,989	48,555.83	5,119	1,149	18,675.52	5,137	79,605.33
DECEMBER	5,249	1,223	17,637.62	21,123	3,910	79,235.75	8,125	1,504	30,475.63	6,637	127,349.00
JANUARY 72	5,598	1,415	19,276.50	17,669	3,918	65,985.02	6,796	1,507	25,379.14	6,840	110,642.66
FEBRUARY	5,739	1,439	19,249.25	16,938	4,023	70,638.70	7,284	1,547	27,245.96	7,009	117,333.91
MARCH	7,159	1,782	24,638.32	22,121	4,653	82,768.46	8,508	1,790	31,834.38	8,225	139,241.16
APRIL	7,576	1,871	25,695.36	23,972	4,806	88,614.44	9,220	1,848	34,082.85	8,525	148,392.65
MAY	10,235	2,256	35,598.91	37,247	6,293	128,278.61	14,326	2,420	49,338.48	10,969	213,216.00
JUNE	19,360	3,244	66,915.14	85,405	10,980	322,864.51	32,849	4,223	124,180.03	18,447	513,959.68
TOTAL FY 72	71,608	16,278	245,739.69	264,160	47,611	976,647.36	101,609	18,312	375,637.76	82,201	1,598,024.81
JULY 72	534	213	1,841.92	2,011	629	7,116.58	773	242	2,737.17	1,084	11,695.67
AUGUST	1,350	431	4,662.11	5,253	1,373	20,706.23	2,020	528	7,964.02	2,332	33,332.36
SEPTEMBER	2,158	604	7,886.49	8,086	1,965	31,328.75	3,110	756	12,049.65	3,325	51,264.89
OCTOBER	3,511	893	12,379.91	12,021	2,719	47,792.63	4,624	1,046	18,381.99	4,658	78,554.53
NOVEMBER	4,690	1,144	16,897.79	14,693	3,158	56,899.24	5,651	1,215	21,884.56	5,517	95,681.59
DECEMBER	5,315	1,365	18,547.08	22,746	4,036	88,188.11	8,749	1,553	33,918.88	6,954	140,654.07
JANUARY 73	5,723	1,570	20,806.00	17,780	3,810	70,772.83	6,838	1,465	27,220.62	6,845	118,799.45
FEBRUARY	5,629	1,401	20,157.94	15,805	3,367	63,226.88	6,079	1,295	24,318.30	6,063	107,703.12
MARCH	5,632	1,506	20,719.85	18,452	3,841	73,364.18	7,097	1,478	28,217.31	6,825	122,301.34
APRIL	4,138	1,141	15,072.71	12,965	2,817	53,714.59	4,987	1,084	20,659.68	5,042	89,446.96
MAY	2,056	524	7,828.01	6,449	1,350	27,465.23	2,481	519	10,563.67	2,393	45,856.91
JUNE	68	11	227.09	132	37	696.27	51	14	267.80	62	1,191.16
TOTAL FY 73	40,804	10,803	147,026.90	136,393	29,103	541,271.51	52,460	11,194	208,183.66	51,100	896,482.07
GRAND TOTAL	342,184	92,537	1,134,513.03	989,094	193,602	3,554,854.32	380,041	74,463	1,367,266.81	360,602	6,056,634.16

*MERGED FYS ARE FY57 THRU FY70

OCHAMPUS

TABLE 5-4 (CONTINUED)

CODE 841214.12400 HANDICAPPED DEPENDENTS
BRANCH OF SERVICE NAVY — PHYSICALLY HANDICAPPED ONLY, EXCLUDING DENTAL — DATE 30 JUNE 73

	NON-RESIDENTIAL		RESIDENTIAL			TOTAL
	CLAIMS	COST	DAYS	CLAIMS	COST	COST
*MERGED FYS	5,055	1,281,170.54	63,536	1,801	654,035.44	1,935,205.98
TOTAL FY 71	4,212	1,184,904.92	38,942	640	289,010.63	1,472,915.55
JULY 71	344	79,958.32	1,643	64	27,955.10	107,913.42
AUGUST	274	77,425.52	4,421	79	43,367.03	120,792.55
SEPTEMBER	404	118,002.18	4,312	126	67,926.19	185,928.37
OCTOBER	473	148,871.08	2,607	106	36,712.63	185,583.71
NOVEMBER	576	193,667.59	8,430	132	52,792.05	246,459.64
DECEMBER	652	239,558.19	4,731	145	77,883.31	316,441.50
JANUARY 72	607	167,304.77	4,914	134	76,073.75	243,378.52
FEBRUARY	635	188,370.12	3,514	122	50,421.75	238,791.87
MARCH	729	238,124.19	4,660	167	78,063.79	316,187.98
APRIL	652	190,088.78	2,615	127	46,511.63	236,600.41
MAY	708	233,290.27	3,885	154	74,468.56	307,758.83
JUNE	753	239,634.05	5,685	191	99,947.13	339,581.18
TOTAL FY 72	6,807	2,113,295.06	51,417	1,547	732,122.92	2,845,417.98
JULY 72	570	160,686.19	4,362	225	116,954.81	277,641.00
AUGUST	475	154,300.71	2,905	138	54,285.59	208,586.30
SEPTEMBER	574	186,369.85	3,497	137	58,198.23	244,568.08
OCTOBER	620	192,844.75	4,542	132	54,200.26	247,045.01
NOVEMBER	567	180,347.65	3,475	106	46,501.25	226,848.90
DECEMBER	580	205,739.72	4,287	96	53,933.67	259,673.39
JANUARY 73	548	182,300.93	1,186	62	26,860.23	209,161.16
FEBRUARY	530	167,760.78	784	59	19,267.75	187,028.53
MARCH	560	201,211.11	734	60	24,607.68	225,818.79
APRIL	460	159,592.04	120	36	13,356.30	172,948.34
MAY	177	60,478.94	612	18	6,678.45	67,157.39
JUNE	3	1,571.00			.00	1,571.00
TOTAL FY 73	5,664	1,853,203.67	26,504	1,069	474,844.22	2,328,047.89
GRAND TOTAL	21,738	6,432,574.19	180,399	5,057	2,149,013.21	8,581,587.40

*MERGED FYS ARE FY57 THRU FY70

OCHAMPUS

TABLE 5-5 PHYSICIAN OUTPATIENT CARE, EXCLUDING DRUGS, HANDICAPPED AND DENTAL

30 JUNE 73

	CODES 841214.12100 & 841214.12500 DEPENDENTS OF ACTIVE DUTY AND NATO PERSONNEL					CODE 841214.12200 DEPENDENTS OF RETIRED AND DECEASED MEMBERS INCLUDING TITLE 111				
	VISITS	AVERAGE COST PER VISIT	CLAIMS	AVERAGE COST PER CLAIM	COST	VISITS	AVERAGE COST PER VISIT	CLAIMS	AVERAGE COST PER CLAIM	COST
*MERGED FYS	692,166	13.52	179,178	52.24	9,359,536.92	656,703	11.70	158,312	46.52	7,681,526.37
TOTAL FY 71	192,417	16.41	49,647	63.61	3,157,915.50	398,166	15.14	117,602	51.25	6,027,635.72
JULY 71	5,065	18.11	1,740	52.71	91,715.51	15,319	17.80	6,110	44.62	272,657.91
AUGUST	6,622	21.15	2,211	63.35	140,056.99	20,935	19.06	7,626	52.32	398,973.29
SEPTEMBER	8,775	18.58	2,419	67.41	163,068.94	41,089	19.68	14,319	56.46	808,433.68
OCTOBER	10,936	17.31	2,793	67.77	189,284.96	15,314	14.79	4,709	48.09	226,432.39
NOVEMBER	13,531	17.05	3,241	71.16	230,638.63	36,490	17.05	11,324	54.95	622,261.52
DECEMBER	15,349	17.59	3,525	76.59	269,964.51	49,175	15.34	12,860	58.64	754,118.50
JANUARY 72	16,277	15.84	3,937	65.48	257,792.04	42,370	16.39	13,523	51.35	694,396.48
FEBRUARY	17,866	15.51	4,361	63.55	277,139.17	45,517	16.66	14,105	53.75	758,173.05
MARCH	20,333	15.14	4,989	61.71	307,858.47	51,113	16.49	16,286	51.74	842,628.36
APRIL	22,148	14.94	5,262	62.86	330,792.65	51,586	16.31	15,554	54.10	841,500.83
MAY	26,279	14.73	6,364	60.82	387,056.04	64,131	15.23	18,982	51.47	976,984.03
JUNE	50,840	13.75	10,034	69.64	698,803.63	115,490	12.72	26,295	55.88	1,469,269.33
TOTAL FY 72	214,021	15.63	50,876	65.73	3,344,171.54	548,529	15.80	161,693	53.59	8,665,828.90
JULY 72	8,166	18.81	2,941	52.23	153,610.98	15,206	18.18	5,460	50.64	276,502.04
AUGUST	14,706	21.43	4,862	64.56	315,161.42	17,827	19.87	6,460	54.85	354,306.10
SEPTEMBER	17,302	24.58	5,981	71.11	425,303.77	19,034	20.65	7,255	54.18	393,052.45
OCTOBER	17,712	26.83	6,809	69.79	475,212.50	21,823	22.15	8,891	54.37	483,393.62
NOVEMBER	19,008	26.22	7,042	70.79	498,472.71	23,621	21.22	9,071	55.25	501,139.09
DECEMBER	23,966	23.51	7,792	72.32	563,546.16	28,836	19.11	9,543	57.74	550,966.82
JANUARY 73	23,561	23.05	8,198	66.24	543,020.82	25,535	20.41	9,938	52.45	521,267.70
FEBRUARY	20,889	26.17	7,566	72.27	546,760.79	23,247	21.74	9,229	54.76	505,335.16
MARCH	23,354	24.77	8,037	71.97	578,446.09	25,760	20.36	9,589	54.69	524,415.15
APRIL	21,943	20.49	5,971	75.31	449,698.29	20,705	18.13	6,551	57.29	375,310.80
MAY	7,249	17.23	1,983	62.97	124,873.62	7,070	16.43	2,282	50.91	116,181.62
JUNE	508	4.69	48	49.60	2,380.94	252	10.24	44	58.66	2,581.01
TOTAL FY 73	198,364	23.58	67,250	69.54	4,676,488.09	228,916	20.11	84,313	54.61	4,604,471.48
GRAND TOTAL	1,296,968	15.84	346,951	59.20	20,538,112.05	1,832,314	14.72	521,920	51.69	26,979,462.47

*MERGED FYS ARE FY57 THRU FY70

CCHAMPUS

TABLE 5-5 (CONTINUED)

PHYSICIAN OUTPATIENT CARE, EXCLUDING DRUGS, HANDICAPPED AND DENTAL
BRANCH OF SERVICE NAVY DATE 30 JUNE 73

	CODE 841214.12300 RETIRED MEMBERS					CODE 841214.12100, 841214.12500, 841214.12000 AND 841214.12300 TOTALS				
	VISITS	AVERAGE COST PER VISIT	CLAIMS	AVERAGE COST PER CLAIM	COST	VISITS	AVERAGE COST PER VISIT	CLAIMS	AVERAGE COST PER CLAIM	COST
MERGED FYS	154,093	12.38	40,650	46.94	1,907,929.38	1,502,962	12.61	378,140	50.11	18,948,992.67
TOTAL FY 71	80,935	14.60	25,571	46.22	1,181,786.17	671,518	15.44	192,820	53.77	10,367,337.39
JULY 71	2,745	17.29	1,241	38.22	47,428.54	23,129	17.80	9,091	45.30	411,801.55
AUGUST	3,653	20.03	1,655	44.21	73,174.67	31,210	19.62	11,492	53.27	612,204.95
SEPTEMBER	7,215	17.98	2,648	48.98	129,701.60	57,079	19.29	19,386	56.80	1,101,204.22
OCTOBER	3,585	14.25	1,217	41.99	51,102.40	29,835	15.65	8,719	53.54	466,819.71
NOVEMBER	6,755	17.15	2,389	48.49	115,833.87	56,776	17.06	16,954	57.14	968,734.02
DECEMBER	9,283	14.99	2,728	51.01	139,147.53	73,807	15.76	19,113	60.86	1,163,230.54
JANUARY 72	7,240	16.69	2,850	42.40	120,847.79	65,887	16.29	20,310	52.83	1,073,036.29
FEBRUARY	8,006	16.14	2,836	45.53	129,228.30	71,389	16.31	21,304	54.66	1,164,540.52
MARCH	9,579	16.62	3,370	47.24	159,190.96	81,025	16.16	24,645	53.14	1,309,677.79
APRIL	9,489	16.34	3,282	47.25	155,088.20	83,223	15.95	24,098	55.08	1,327,381.68
MAY	12,186	15.35	4,140	45.18	187,024.65	102,596	15.12	29,486	52.60	1,551,064.72
JUNE	22,697	12.26	5,697	48.83	278,188.15	189,027	12.94	42,026	58.21	2,446,261.11
TOTAL FY 72	102,433	15.48	34,055	46.57	1,585,956.66	864,983	15.72	246,624	55.13	13,595,957.10
JULY 72	3,023	19.40	1,412	41.53	58,645.74	26,395	18.52	9,813	49.81	488,758.76
AUGUST	3,932	20.67	1,824	44.55	81,266.91	36,465	20.59	13,166	57.02	750,734.43
SEPTEMBER	4,847	18.71	1,954	46.41	90,679.00	41,183	22.07	15,190	59.84	909,035.22
OCTOBER	5,414	20.16	2,379	45.89	109,165.75	44,949	23.76	16,079	59.06	1,067,771.77
NOVEMBER	5,521	20.80	2,428	47.29	114,880.96	48,150	23.15	18,541	60.11	1,114,442.75
DECEMBER	7,727	16.73	2,699	47.91	129,310.60	60,529	20.55	20,034	62.09	1,243,823.56
JANUARY 73	6,278	19.30	2,763	43.86	121,193.39	55,374	21.41	20,899	56.73	1,185,501.91
FEBRUARY	5,706	20.61	2,516	47.24	118,852.63	49,902	23.46	19,311	60.64	1,170,948.53
MARCH	6,025	21.06	2,645	47.98	126,913.92	55,139	22.30	20,271	60.67	1,229,775.19
APRIL	4,476	18.68	1,715	48.79	83,601.80	47,124	19.28	14,237	63.82	908,610.93
MAY	1,652	17.50	611	47.32	28,913.95	15,471	16.90	4,876	55.37	269,969.19
JUNE	33	37.91	13	96.24	1,251.14	793	7.83	105	59.17	6,213.09
TOTAL FY 73	54,694	19.47	22,959	46.37	1,064,625.79	481,974	21.47	174,522	59.28	10,345,595.36
GRAND TOTAL	392,155	14.64	123,235	46.58	5,740,298.00	3,521,437	15.12	992,106	53.68	53,257,872.52

MERGED FYS ARE FY57 THRU FY70

OCHAMPUS -

TABLE 5-6

OUTPATIENT COSTS
FY 1973

Beneficiary	Claims	Visits	Gov Cost	Cost Visit
Dependents	46,581	122,628	2,020,640	$16.48
Cost of Processing Claims/Visit 5.92 * 46,581/122,628				2.25
Drugs	10,803	198,364	147,027	.74
Cost of Processing Claims/Visit 5.92 * 10,803/198,364				.32
				$19.79
Retired Personnel	20,220	44,487	748,374	$16.82
Cost of Processing Claims/Visit 5.92 * 20,220/44,487				2.69
Drugs	11,194	64,694	208,183	3.22
Cost of Processing Claims/Visit 5.92 * 11,194/64,694				1.02
				$23.75
Dependents of Retired and Deceased	69,674	176,529	2,946,543	$16.69
Cost of Processing Claims/Visit 5.92 * 69,674/176,529				2.33
Drugs	29,130	228,916	541,272	2.36
Cost of Processing Claims/Visit 5.92 * 29,130/228,916				.75
				$22.13

Oakland Naval Hospital on the demographic characteristics of the population. On page 58, Table 7 of his thesis, Norton presents the length of stay by age, sex, and patient category. He also reports the sample size, and it is this associated with the age, sex, and beneficiary agroup from which we can determine demographic characteristics of users of military health services. These data have been included as Table 5-7.

CHAMPUS similarly reports the demographic characteristics of its users by age and relationship to sponsor for each beneficiary category. While the classifications are not identical with, but are rather somewhat overlapping to those used by Norton, this classification is similar enough to make a comparison. The CHAMPUS data has been included here as Table 5-8. Bar-chart comparisons showing the relative distribution by age and beneficiary groups are included as Figures 5-4 through 5-8. The major discrepancy is for dependents of active duty personnel. There are relatively more dependents of age 0-5 reported in the Oakland data. This is primarily due to a difference in reporting procedures. The CHAMPUS data excludes newborn babies. The second discrepancy is for the age 20-30 years. CHAMPUS reports relatively more of this age group. It reflects that CHAMPUS delivers more babies than Oakland Naval Hospital. While the distributions are not identical, they are certainly similar and do not provide evidence to reject the hypothesis that the mean price of CHAMPUS care would be altered if these beneficiaries used the civilian source of care.

A second important comparison is an examination of the pattern of incidence of diseases. The Navy Postgraduate School study group has provided us with the results of their sample that show the beneficiary status and the medical group (ICDA classification) of the diseases treated at Oakland Naval Hospital. CHAMPUS also provided this information in annual report M734 for calendar year 1972. The relative incidence of disease between those treated in the Oakland Naval Hospital and the entire CHAMPUS population is shown in Figure 5-9. Again, the pattern is similar with the exception of categories V and XI. Category V is mental disorders. It was observed earlier that this type of care is unavailable in the military hospitals relative to that which is provided in CHAMPUS. Additionally, although it is not revealed by this figure which compares only admissions, the length of stay is much shorter for mental disorders in the military hospitals because patients are discharged to the civilian sector. Because we have deleted this category from our CHAMPUS sample to determine the government cost of care, this discrepancy has been eliminated. The second discrepancy is for category XI, complications of pregnancy, childbirth, and the puerperium (ICDA 639-678). More detailed data indicates that two-thirds of these CHAMPUS admissions are ICDA 650, delivery without mention of complications. However, this significantly higher rate of deliveries could bias the financial CHAMPUS data if the cost of delivery is far different from the mean of the distribution. Table 5-1 indicates that this is not the case. Because the vast majority of deliveries is for beneficiaries of the active duty personnel, we will consider only that group. Their average cost for all inpatient care, without the adjustment to reflect the cost of processing claims, is $714 per admission. For deliveries in that same beneficiary classification the average case cost is $790. The result is that the CHAMPUS price is biased upwards due to the inclusion of so many deliveries.

The above discussion supports the thesis that there is no radical difference in the types of medical care delivered in Oakland Naval Hospital and under CHAMPUS. The broader implication is that the patterns are similar throughout the medical regions. This is not conclusive proof, but is a very strong indication.

TABLE 5-7

LENGTH OF STAY; BY AGE, SEX, AND PATIENT CATEGORY

AGE	MALE MEAN	MALE VARIANCE	MALE NUMBER	FEMALE MEAN	FEMALE VARIANCE	FEMALE NUMBER
ACTIVE DUTY						
0-5	0.0	0.0	0	0.0	0.0	0
6-20	24.2	861.6	1149	22.4	786.1	48
21-30	26.1	1060.5	1510	15.6	488.4	80
31-40	25.5	1103.1	574	18.4	585.2	10
41-50	27.6	1385.4	155	23.3	1555.2	12
51-60	21.4	1117.1	31	13.8	219.8	5
61-70	0.0	0.0	0	0.0	0.0	0
71 AND >	0.0	0.0	0	0.0	0.0	0
RETIRED						
0-5	0.0	0.0	0	0.0	0.0	0
6-20	55.0	0.0	0	0.0	0.0	0
21-30	14.0	955.0	75	4.0	0.0	1
31-40	8.8	94.0	70	6.6	20.2	5
41-50	9.0	151.2	391	11.4	445.0	10
51-60	9.9	128.9	516	9.5	52.3	10
61-70	11.0	156.0	303	5.9	12.5	10
71 AND >	12.2	179.2	131	1.0	0.0	1
RESERVE						
0-5	0.0	0.0	0	0.0	0.0	0
6-20	50.7	1461.6	3	0.0	0.0	0
21-30	107.0	10609.0	2	0.0	0.0	0
31-40	12.3	82.9	3	0.0	0.0	0
41-50	1.0	0.0	2	0.0	0.0	0
51-60	0.0	0.0	0	0.0	0.0	0
61-70	0.0	0.0	0	0.0	0.0	0
71 AND >	0.0	0.0	0	0.0	0.0	0
DEPENDENT, ACTIVE DUTY						
0-5	4.2	21.1	831	4.5	61.0	777
6-20	3.8	20.3	258	4.2	31.5	592
21-30	10.8	291.8	6	4.5	31.7	1113
31-40	3.0	1.0	2	5.2	35.1	438
41-50	0.0	0.0	0	6.1	70.5	111
51-60	0.0	0.0	0	7.0	42.7	29
61-70	30.4	490.6	5	21.8	420.2	12
71 AND >	0.0	0.0	0	10.8	30.6	9
DEPENDENT, RETIRED						
0-5	3.9	18.8	65	2.9	2.9	20
6-20	6.3	81.8	323	5.1	244.3	317
21-30	11.0	369.9	22	4.7	24.7	116
31-40	4.4	4.2	10	6.3	41.0	174
41-50	10.3	42.9	3	7.8	123.5	568
51-60	5.2	8.6	5	8.4	118.6	454
61-70	6.2	14.5	6	8.6	88.2	210
71 AND >	0.0	0.0	0	10.4	108.6	122

TABLE 5-7

LENGTH OF STAY; BY AGE, SEX, AND PATIENT CATEGORY (Continued)

ALL OTHERS

	MALE			FEMALE		
AGE	MEAN	VARIANCE	NUMBER	MEAN	VARIANCE	NUMBER
0-5	1.5	0.3	4	6.0	1.0	2
6-20	7.6	53.8	5	9.7	196.6	6
21-30	15.3	323.3	18	5.7	25.7	11
31-40	11.6	50.2	7	0.0	0.0	1
41-50	14.7	361.9	6	3.0	0.0	1
51-60	23.1	1005.6	8	26.0	0.0	1
61-70	2.0	0.0	1	0.0	0.0	0
71 AND >	0.0	0.0	0	0.0	0.0	0

Source: [15]

TABLE 5-8

ANNUAL REPORT M732–CALENDAR YEAR 1972–NUMBER OF HOSPITAL ADMISSIONS
BY AGE, SEX, RELATIONSHIP, AND TYPE OF CARE
DEPENDENTS OF ACTIVE DUTY PERSONNEL

PROCESSED THRU
APRIL 30, 1973

RELATIONSHIP	AGE GROUP	DELIVERIES	MEDICAL NP	MEDICAL OTHER	SURGICAL	TOTAL
SPOUSE	15	554	20	266	124	964
	15-19	21,025	811	8,851	5,957	36,644
	20-24	34,767	2,341	15,362	15,319	67,789
	25-34	16,802	4,206	11,632	18,400	51,040
	35-44	1,324	2,281	4,182	7,456	15,243
	45-54	51	441	1,080	1,353	2,925
	55-64	9	32	106	110	257
	65+			1	3	4
	UNKNOWN					
	TOTAL	74,532	10,132	41,480	48,722	174,866
DAUGHTER	01	5	8	5,984	1,142	7,139
	01-04		35	4,772	4,153	8,960
	05-09	1	91	1,733	4,374	6,199
	10-14	42	587	1,611	2,527	4,767
	15-19	498	958	1,382	2,483	5,321
	20-24	65	121	210	257	653
	25-34	8	7	13	25	53
	35+	1		6	8	15
	UNKNOWN					
	TOTAL	620	1,807	15,711	14,969	33,107
SON	01	7	18	7,750	2,358	10,133
	01-04	1	89	6,313	5,772	12,175
	05-09	1	344	2,644	5,215	8,204
	10-14		836	1,941	2,569	5,346
	15-19	2	913	1,159	1,415	3,489
	20-24	1	140	175	162	478
	25-34	1	6	7	10	24
	35+		3	19	6	28
	UNKNOWN					
	TOTAL	13	2,349	20,008	17,507	39,877
GRAND TOTAL		75,165	14,288	77,199	81,198	247,850

TABLE 5-8 (Continued)

ANNUAL REPORT M732–CALENDAR YEAR 1972–NUMBER OF HOSPITAL ADMISSIONS
BY AGE AND TYPE OF CARE
RETIRED PERSONNEL

PROCESSED THRU
APRIL 30, 1973

AGE GROUP		MEDICAL NP	MEDICAL OTHER	SURGICAL	TOTAL
45	21	1,250	5,438	3,498	10,207
45-54		1,910	10,011	6,370	18,291
55-64		871	6,825	4,906	12,602
65+		17	183	112	312
UNKNOWN					
TOTAL	21	4,048	22,457	14,886	41,412

TABLE 5-8 (Continued)

ANNUAL REPORT M732–CALENDAR YEAR 1972–NUMBER OF HOSPITAL ADMISSIONS
BY AGE, SEX, RELATIONSHIP, AND TYPE OF CARE
DEPENDENTS OF RETIRED OR DECEASED PERSONNEL

PROCESSED THRU
APRIL 30, 1973

RELATIONSHIP	AGE GROUP	DELIVERIES	MEDICAL NP	MEDICAL OTHER	SURGICAL	TOTAL
SPOUSE	15	7	7	15	20	49
	15-19	433	27	209	222	891
	20-24	1,857	123	938	1,033	3,951
	25-34	1,902	587	2,243	3,127	7,859
	35-44	1,064	2,297	7,491	10,673	21,525
	45-54	27	2,910	11,436	13,793	28,166
	55-64	2	1,048	7,030	5,651	13,731
	65+		17	171	118	306
	UNKNOWN					
	TOTAL	5,292	7,016	29,533	34,637	76,478
DAUGHTER	01	1	4	454	120	579
	01-04		2	768	693	1,463
	05-09		26	893	1,648	2,567
	10-14	27	337	1,668	2,254	4,286
	15-19	846	1,415	3,568	5,458	11,287
	20-24	95	380	712	1,032	2,219
	25-34	1	79	45	30	155
	35+		14	20	19	53
	UNKNOWN					
	TOTAL	970	2,257	8,128	11,254	22,609
SON	01		2	603	215	820
	01-04		13	1,028	864	1,905
	05-09		95	1,207	1,850	3,152
	10-14		437	2,212	2,596	5,245
	15-19		1,223	3,480	3,768	8,471
	20-24		469	695	861	2,025
	25-34		51	52	20	123
	35+		5	27	15	47
	UNKNOWN					
	TOTAL		2,295	9,304	10,189	21,788
	GRAND TOTAL	6,262	11,568	46,965	56,080	120,875

Source: OCHAMPUS

FIGURE 5-8

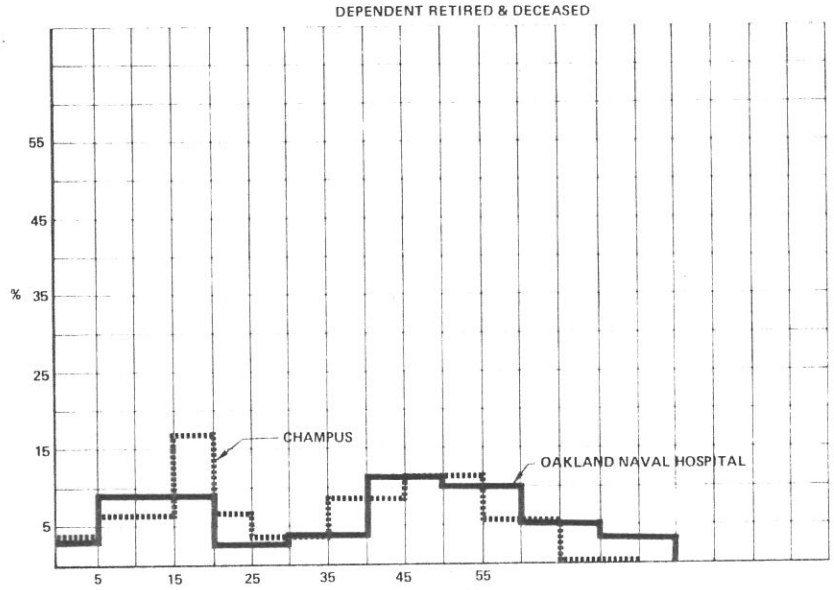
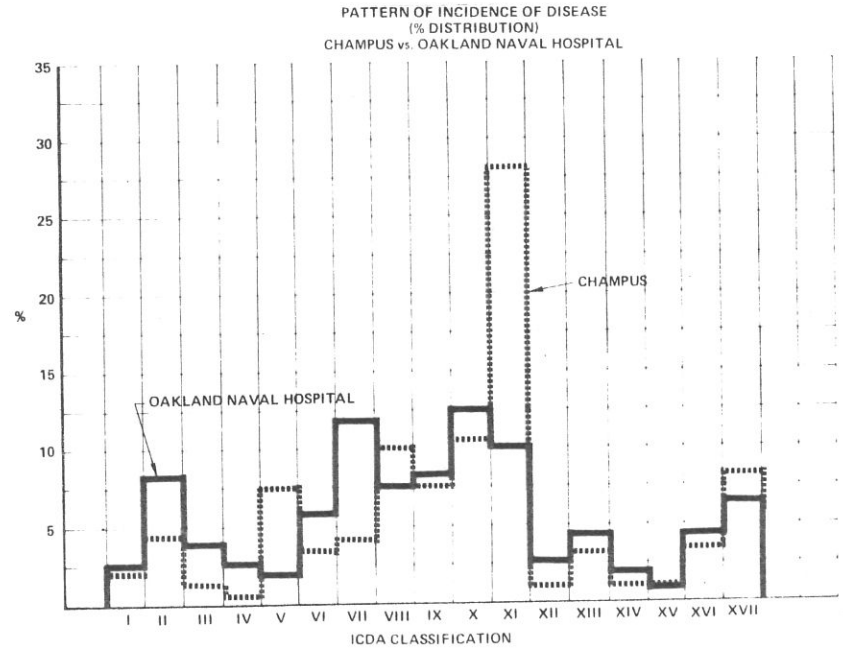


FIGURE 5-9



Obviously there is a cost for the civilian beneficiaries to use CHAMPUS. Generally this is not true if they use Navy health care facilities. The dependents of the active duty personnel are authorized hospitalization, outpatient care, and drugs free of charge, subject to the availability of space. Retired members of the uniformed services receive outpatient care from the military facilities at no charge and hospitalization at a cost of $1.75 per day for their dependents, the cost of subsistence for officers, and no charge for enlisted persons. These medical services are also based on the availability of space and they have a lower priority than services for dependents of active duty personnel.

Active duty dependents who reside with the active duty members are eligible under CHAMPUS for inpatient care only if they have a non-availability statement, live in excess of 30 miles from a uniform service facility capable of providing the care, or live in one of the states of Iowa, Minnesota, Oregon, Vermont, West Virginia, or Wisconsin where there are no military medical facilities. If the active duty dependent is eligible for CHAMPUS benefits, then for inpatient care he must pay the first $25 of the hospital charge or $1.75 per day, whichever is the greater. The government will pay the remainder subject to certain price ceilings. For outpatient care a deductible must be paid in each fiscal year. If the claim is for one member of the family, this deductible is $50; if the claim is for two or more members than the deductible is $100. The government pays 80 percent of the remaining reasonable charges for authorized care.

Retirees and their dependents do not need a non-availability statement. For authorized inpatient care the government will pay 75 percent of the reasonable charges of the hospital and professional services. For outpatient care a deductible of $50 for one beneficiary or $100 per family must be paid prior to the government incurring any obligation. After this deductible has been paid, the government pays 75 percent of any reasonable charges for authorized care.

The definitions used for inpatient and outpatient care complicate matters somewhat. In the case of pregnancy all prenatal and postnatal doctor visits as well as all drugs obtained in the civilian pharmacy relating to pregnancy and complications thereof are reported as inpatient care. As a result, the deductible discussed above does not apply. For all other conditions, any outpatient visits that occur within 30 days prior to and 120 days after hospitalization are also counted as inpatient care. Again this seems to be an administrative decision to avoid charging the CHAMPUS users the deductible associated with outpatient care.

The relevance of these requirements for payment is that the pecuniary price to the CHAMPUS users is not zero as it is for those who use the Navy medical facilities. This positive price not only tends to temper demand but it also discourages what is referred to as "Cadillac medicine," the use of the most highly trained and expensive experts regardless of the required level of sophistication. Of course, accurate estimates of the impact of price rationing must be made in order to calculate the expected increase in cost of CHAMPUS.

Some may object to this approach as they believe health care should be provided as a right to all. It would be convenient if we could do so and in unlimited quantities. Because this is impossible with the current available resources, medical care must be rationed. One of the functions of price is to perform this rationing. Other methods are available but are generally less efficient and more costly. The difficulties encountered by the Nixon administration in attempting to establish

economic controls should be warning enough as to the problems inherent in such a policy. Currently, the Navy medical system allows the queue, or the waiting line, to ration these resources. People demanding care often wait for up to three hours to see a physician or spend an entire day waiting in various lines and sometimes are still not satisfied.

Another criticism of the use of price for rationing is that it implies discrimination against those with less income. This occurs every day in the purchase of cars, houses, food, clothing—virtually every market transaction. However, somehow medical care is different; it is often regarded as a "right" rather than a "good." This objective may be overcome in some part through a differential pricing based on family earnings [11].

The significance of the above discussion is determined by the magnitude of the response of persons demanding medical care to different prices of that care—the elasticity of demand. For the case of office visits, this has been simply illustrated in Figure 5-10. In both panels A and B the price of a physician office visit is shown on the vertical axis. The horizontal axis measures the number of physician visits per person per year. The demand curve shows the functional relationship between the number of visits per year as the price varies. Panel A shows the hypothetical case when the demand is highly inelastic, i.e., the consumers are little influenced by the monetary charge. They require virtually the same number of visits independent of the price. If we assume that the initial price is P_0 then they would demand Q_0 visits per year. From the diagram we can see that if a 25-percent co-insurance is charged (price = 25-percent P_0), individuals will demand Q_2 visits per year. At a zero charge, they will demand Q_1 visits.

Panel B shows the case of a relatively elastic demand for medical care. If we again assume that the initial price charges is P_0, then the number of visits demanded per year would be Q_0, as it was in Panel A. However, with a zero charge the number of visits can be determined by the intersection of the demand curve with the horizontal axis. The number of visits demanded would be Q_1. Clearly in this case the impact of the insurance would be to significantly increase the number of office visits demanded per year. This impact may be reduced by instituting a 25-percent co-insurance as has been shown at 25-percent P_0. Then the quantity demanded would be Q_2, a much more moderate amount.

This analysis should be tempered with two additional facts: the first is the recognition that the consumers are worse off after the institution of the 25-percent co-insurance than with the zero price. First, they will now consume less medical care, i.e., they will go to see a physician less frequently. Of course, the second factor is that they now have to devote some portion of their income to paying their medical expenses. As a result they will now have less to spend on the other necessities and pleasures of life. These two losses, then, must be balanced against the decrease in cost. If it were a private insurance program, one would expect to have lower premiums for the beneficiary population, and its costs will be reduced. However, it must be emphasized that a part of this reduction is at the beneficiary population's expense. Economic theory does suggest that the consumer could be compensated such that he would voluntarily agree to such a program at a lower overall cost.

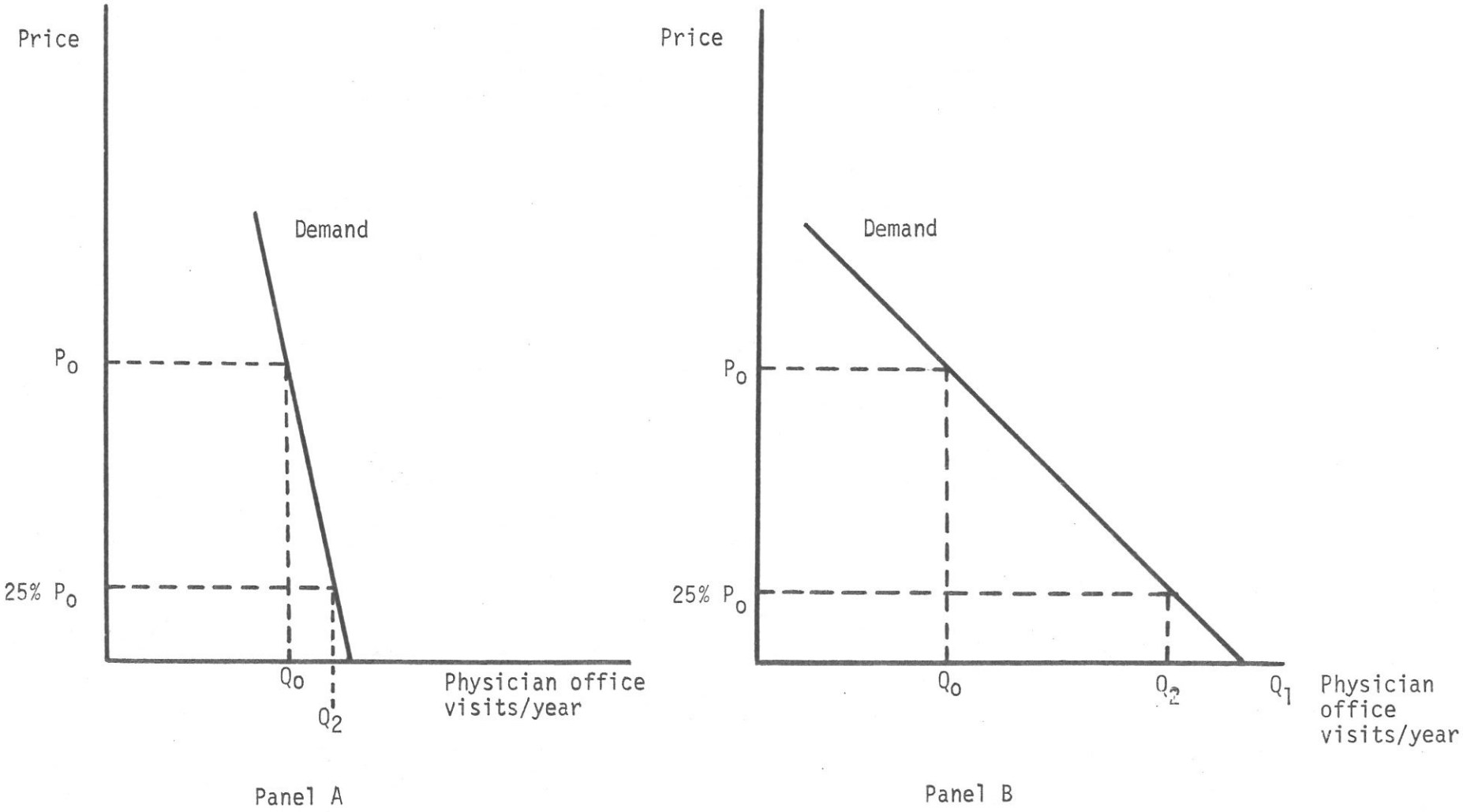


FIGURE 5-10 ELASTICITY OF DEMAND – PHYSICIAN OFFICE VISITS

The above discussion clearly indicates that the important variable is the slope or the elasticity of the demand curve. If it is highly inelastic, then changes in demand associated with changes in price can be ignored. However, if there are indications that the demand is elastic, one would have to expect that this fringe benefit will also increase the demand for medical care.

The empirical estimates of the magnitude of the elasticity of demand are discussed more completely in Appendix C. Those findings will be briefly summarized here. All of the studies of the demand for outpatient care found that price did have a significant impact on the rate of utilization of outpatient services. More specifically: Scitovsky and Snyder [18] reviewed the data from a Palo Alto clinic. They found that a 25-percent co-insurance would result in a 24-percent decline in physician visits and a 23-percent decline in cost. Phelps and Newhouse [17] reviewing this same data found that for their "average" family the 25-percent co-insurance would result in a 32-percent reduction in visits and a 28-percent decline in cost. They also found that groups expected to have a lower time opportunity cost would be affected to a greater extent than others. Jan Paul Acton completed a study of low-income groups in New York City [1]. Its focus was on the effects of waiting and traveling time. He found that for public care a 25-percent increase in traveling time would imply a 75-percent reduction in the number of outpatient visits. For private care this increase in traveling time would result in a 66-percent decline in the number of visits. These large magnitudes are in some part a reflection of the substitution of alternative sources of care rather than an absolute decline in the amount of care demanded. Acton's results also imply that a 25-percent increase in waiting time would decrease the number of visits to physicians in private practice by 22 percent and to those in public clinics by 10 percent. The Phelps and Newhouse study of insurance premiums found that a 25-percent co-insurance would decrease physician expenditures by 30 percent. Their review of the Saskatchewan study showed that a 40-percent co-insurance would reduce physician office visits by 17 percent and home visits by 60 percent. There is undoubtedly a substitution effect between home visits and office visits as their relative prices changed in this last experiment.

These studies indicate that the range in reduction of use of outpatient services is only vaguely defined. Additionally, their findings are not directly applicable to the Navy population. None of them considered the impact of a deductible, which we anticipate would increase the relative reduction in the use of outpatient facilities. Additionally, the demographic characteristics as well as the opportunity time cost of the use of outpatient facilities probably varies to the extreme across these studies, especially when compared to the Navy beneficiary population. However, the above findings do indicate a range of the magnitude of the reduction of utilization of outpatient services if the civilian beneficiaries were faced with the co-insurance and deductible provisions of CHAMPUS or a copayment charge for use of outpatient services provided in Naval dispensaries or hospitals. That range is a reduction in the rate of utilization from 30 to 50 percent.

5.3 Some Cost Scenarios

Prior to explicit consideration of scenarios, some caveats are in order. First of all, the estimates that have been derived should only be regarded as first-order approximations. They are far better estimates than what has been available previously; however, they are still imprecise. This implies that policy changes based on this analysis should be implemented gradually, in several phases. This would allow more information to be gathered and more precise estimates to be calculated.

Secondly, some of the hospitals that have been included in this sample are slated for closure in the next two years. Among these are St. Albans, Boston, Portsmouth (New Hampshire), Quonset Point, and the Long Beach Repose Annex. We would expect these hospitals' fixed costs to be zero after their closure. Thirdly, some of these hospitals are overseas. As a result they may require special consideration, especially for civilian beneficiaries of the activy duty population. Finally, we have left to others consideration of the legal and political constraints which may eliminate some of the scenarios that we have evaluated from the feasible set.

All of the scenarios that we have evaluated have involved altering the scale of operations of the Navy's health care facilities. This would be accomplished either by denying certain segments of the civilian beneficiaries access to these facilities by substituting the CHAMPUS source of care or by altering the incentives of both providers and consumers. The method used to calculate the changes in cost is described below.

For inpatient care we have calculated the marginal costs of an acute operating bed. In order to determine the change in the number of operating beds that would occur if certain beneficiary segments were not to receive their health care from the military, we have preserved the occupancy rate of the hospitals. That is, if initially a hospital reported that it had an 80-percent occupancy rate, we would reduce the number of operating beds by 1.25 times the average daily patient load for the excluded beneficiary group. Had we just reduced the number of operating beds by the average daily patient load, the occupancy rate would have fallen below the preexisting level. This specification implies that the size of the hospital has been determined such that there is this safety factor, in the example above, of 20 percent unoccupied beds that are required due to the random fluctuation and seasonality of the demand for inpatient care.

The marginal cost of CHAMPUS has been derived above. This increase in cost due to the greater CHAMPUS load was estimated based on the number of cases (admissions) that would no longer be served in military health care facilities.

We have considered both the patient's and the government's share. Implicitly we have assumed that the increased price facing consumers due to the co-insurance provisions of CHAMPUS for inpatient care would not reduce the number of cases treated, i.e., that the demand for inpatient care is perfectly inelastic. If there are many elective surgical procedures in military hospitals, this assumption would be very conservative as this demand then would be elastic.

For outpatient care we have estimated the marginal cost of an outpatient visit. To determine the decrease in costs to the medical regions from denying certain segments of the beneficiary population the privilege of using the outpatient clinics, we have multiplied the number of outpatient visits times this marginal cost. To calculate the increased cost of CHAMPUS to both the Navy and the patients we have multiplied the marginal costs facing the government and the consumer as derived above and included the effect of an elastic demand curve. We have made calculations assuming both a 30-percent and a 50-percent reduction in the number of outpatient visits if the source of care were CHAMPUS.

The detailed results of our calculations are reported tabularly in Appendix D. Those tables show the expected change in cost if each beneficiary group were denied access to Navy medical care. The change in costs are reported both regionally and in total, both separately and combined for inpatient and outpatient care. Additionally, both the reduction in the medical regions' costs and the increased cost of CHAMPUS (for both the government and the patients) are reported. The parameters used in the calculations are shown above each table.

The totals which summarize the financial impact have been included here as Tables 5-9, 5-10, and 5-11. Table 5-9 shows the six-month estimates for inpatient care. Total government costs would increase if all dependents of active duty population were transferred to CHAMPUS, but would decrease if the retired personnel and/or their dependents and those of the deceased personnel were transferred to CHAMPUS. The savings result in large part from the cost-sharing provisions of CHAMPUS which were explained above. As Table 5-10 shows, the savings that may be anticipated due to reduction in outpatient care are less substantial than those for inpatients. These cost savings would be cost increases except for the anticipated reduction in demand due to the increased prices facing the consumers. If we combine both inpatient and outpatient costs and assume that no civilian beneficiaries will be allowed access to military health care facilities, our projections indicate a reduction in costs for a six-month period of $15 million. Annually this reduction would be in excess of $30 million. However, it should be noted that none of these savings would be due to transferring the source of care to CHAMPUS for all the dependents of the active duty population. If only the retired personnel and their dependents and the dependents of deceased personnel were required to receive their care through CHAMPUS, the cost savings on an annual basis would be in excess of $31.5 million. As can be seen from Table 5-11 they would have additional out-of-pocket expenses for their medical care, on average about $60 per person per year, and as a result they would be worse off. It is doubtful that this would significantly alter the recruiting incentives due to the implicit discounting that occurs when individuals consider benefits that will accrue only in the distant future.

An alternative to diverting some part of the civilian beneficiary care to CHAMPUS is to provide outpatient services contingent upon the copayment of some portion of the marginal cost of that visit. This policy would not only generate revenue but would also control the rate of utilization of outpatient services, which are significantly above the rate for the civilian sector (see Appendix E). For the sake of an illustrative example let's assume that a policy was established requiring the users of clinical services to pay 25 percent of the marginal cost of those services. Then using Table 5-10 and assuming that the users of military care would continue to do so rather than substituting CHAMPUS care, we can calculate the resulting cost savings. Immediately we know that the cost to the government must be reduced to 75 percent of what it was originally due to the cost sharing. Additionally, studies of the civilian sector have indicated that there would be approximately a 25-percent decreased utilization of the outpatient services. As a result, only 75 percent of the total expenses, including both the patient's and the government's share, would be incurred. Then the change in the total UIC costs would be:

$$\Delta \text{UIC cost} = (1 - .75*.75)\,(-43{,}721{,}085) = -\$19{,}127{,}975.$$

TABLE 5-9

COST SCENARIO SUMMARY

(6-MONTHS ESTIMATE)

PRE-AVF PRICES, 30% REDUCTION OF OPV

INPATIENT	ΔOP. BED	ΔOBD	ΔUIC COST	CHAMPUS CASES	CHAMPUS GOV.	COST PAT.	ΔGOV. COST
No Dependents	-1,404	-202,899	-26,653,536	39,724	29,077,968	10,725,548	2,424,432
No Retired	- 973	-145,882	-18,471,432	11,039	8,544,186	5,574,615	- 9,927,246
No Dependents of Retired & Deceased	- 879	-131,244	-16,686,936	15,888	10,215,984	5,576,688	- 6,470,952
Total	-3,256	-480,025	-61,811,904	66,651	47,838,138	12,233,931	-13,973,766

TABLE 5-10
COST SCENARIO SUMMARY
(6-MONTHS ESTIMATE)
PRE-AVF PRICES, 30% REDUCTION OF OPV

OUTPATIENT	UIC△OPV	△UIC COST	△CHAMPUS OPV	△CHAMPUS GOV.	COST PATIENT	△GOV. COST
No Dependents	-2,026,878	-30,403,170	1,418,814	28,376,269	14,188,133	-2,026,901
No Retired	- 344,350	- 5,165,250	241,045	5,785,063	4,097,745	619,813
No Dependents of Retired & Deceased	- 543,511	- 8,152,665	380,458	8,370,052	4,565,477	217,387
Total	-2,914,739	-43,721,085	2,040,317	42,531,384	19,851,355	-1,189,701

TABLE 5-11
COST SCENARIO SUMMARY
(6-MONTHS ESTIMATE)
PRE-AVF PRICES, 30% REDUCTION OF OPV

COMBINED	ΔUIC ADMISSIONS	OP. BED	ΔOP√	ΔUIC COST	ΔCHAMPUS GOV.	COST PAT	ΔCOST GOVERNMENT
No Dependents	39,724	1,404	2,026,878	- 57,056,706	57,454,237	15,260,681	397,531
No Retired	11,039	973	344,350	- 23,636,682	14,329,249	9,672,440	- 9,307,433
No Dependents of	15,888	879	543,511	- 24,839,601	18,586,036	10,142,165	- 6,253,565
Total	66,651	3,256	2,914,739	-105,532,989	90,369,522	35,075,286	- 15,163,467

If this were adjusted to an annual rate, it would imply that for outpatient services alone the total cost reduction would be $38.2 million. Half of this reduction would result from the cost sharing and the other half from decreased utilization. This policy would also probably tend to decrease the disutility that the medical corps experiences serving in the dispensaries. It would decrease the "sniffle" complaints and provide a more interesting case mix for the clinical physicians.

5.4 Health Maintenance Organizations

One final alternative is to restructure Navy medicine along the lines of a health maintenance organization. Contrary to what some have indicated, military medical regions are not equivalent to the HMO's of the civilian sector. This belief has probably been fostered because, in the short run, military hospitals are budget constrained. However, the analogy breaks down quickly. If the military chooses not to provide care for civilian beneficiaries, it can refuse to do so either explicitly through the provision of a non-availability statement or by merely denying access, or implicitly through long lines, discontinuous service, and other disincentives. In short, civilian beneficiaries can be shunted to CHAMPUS at will. Additionally, in the long run military medicine is closely akin to fee-for-service medicine. This is due to the fact that their budget justification is based on reported workload activity. The more activity the more dollars that will be allocated. This is true of both the individual hospital and the entire Navy medical support program. As a result, there is an incentive to produce more activity than that which may be required by sound medical practice. In the civilian HMO's in which funding is based only on the number of members enrolled and not on the amount of service provided, there is a disincentive to provide medical services. Of course, there are legal as well as competitive constraints that require sound medical practice to be followed.

The cost saving feature of the HMO is not that it can provide any one service at a substantial savings below the fee-for-service cost (except perhaps for surgery and drugs) but rather that it decreases the utilization rates of inpatient and outpatient services by changing the incentives. (See Appendix E.) It has been found that, compared with the Kaiser-Permanente health care program, males of similar age in the active duty Navy population consume approximately four times as many admissions per thousand, ten times as many occupied bed days per thousand, and twice as many outpatient visits per thousand. These higher rates of utilization result from the incentives that are facing both the consumers and the providers of medical care. For the consumers, i.e., the active duty population, there is unlimited sick leave, a zero price, and perhaps escape from unpleasant duty should they be admitted to a hospital or even spend a morning or an afternoon at a dispensary. For the hospital, there is the prospect of reporting more workload activity which can be used to justify current and future budgets as well as staffing levels. This is especially attractive if the patient is really not very sick and requires little attention, i.e., the cost of providing the care is low relative to the price that Congress and BuMed have implicitly established for funding that hospital.

If the military were to adopt the philosophy of prepaid group practice then these incentives would be altered. The medical region would truly have to face a budget constraint independent of the amount of care which it provides. If there is that alternative source of care, CHAMPUS, this would require an enrollment policy so that the users of military medicine could be identified and denied the use of CHAMPUS. Either the sailors or the line command should be required to pay BuMed co-insurance and perhaps to be provided only with limited amount of sick leave. If the incentives were rearranged in this manner, the cost savings could be significant.

6.0 SUMMARY

Of necessity this report has been extensive. Distinct tasks had to be accomplished, and specific questions had to be answered. Here we will consolidate our findings and extract their implications. The structure used for discussion will again be the formal model of Chapter 3 which asked so many questions, demanded so many answers. But of course even that structure requires good data to yield good analysis. Therefore, we will begin by discussing the shortcomings of the information system before attempting to summarize some of the answers.

The first inadequacy of the input data was the failure to measure and allocate the full cost of military labor to the final measures of output. The Expense Operating Budget, which reports the average cost of providing medical services, uses the composite pay rate to cost military labor. It is inappropriate for two reasons. The first is that it fails to explicitly account for the bonuses for which members of the medical corps qualify. Additionally, it assumes that the government incurs no cost in using military labor other than the wages and the fringe benefits that it pays. This is not true because there are expenses for procurement, training and professional development, and transportation. Additionally, not all of an individual's time is available for filling a productive billet. The time that is unavailable and unproductive is also a cost to the government. The composite pay rate does not consider this "down" time; the billet cost methodology does. The Bureau of Naval Personnel has calculated the billet cost for hospital corpsmen and found that it is more than twice the composite pay rate. We have made a preliminary calculation of the billet costs of the medical corps and have found that on the average it exceeds the officers' composite pay rate by 58 percent. If the $15,000 per year annual bonus is included, the billet cost for the medical corps also exceeds twice the composite pay rate. Since the Expense Operating Budget reports that military salaries are approximately 52 percent of the total operating expense, the cost of military medicine has been significantly underreported.

This problem of underreporting the cost of labor is also evident in the FYDP. Its MPN category does not include the cost of procurement, permanent change-of-station moves, or the training billets for corpsmen or physicians in civilian internship and residency programs. These can all be considered as intermediate goods which should be costed against the final output that is provided by the Bureau of Medicine and Surgery.

The second inadequacy of the measures of the cost of inputs to the medical care program is the failure to properly account for capital. This failure results because the capital budgets, i.e., MILCON and OPN, are separate from the operations and maintenance budget and because the government does not amortize this expense over the capital's useful life. The result is that not only are costs underreported, but also that capital is hoarded at some medical activities when it may be more profitably employed elsewhere. The latter results because there is no cost for a hospital to save its old equipment and no credit if it gives it up. Hence, one would expect to find inventories of equipment that had not been used in several years. This was evident during several of our site visits.

The output measures are certainly biased. This is because the two that are most used—the occupied bed day and the outpatient visit—are not well defined units but rather represent a mix of services. The problem is compounded because these two output measures are also the basis for funding the Navy Medical Support Program. This implies that there is a bias in reporting workload data so as to

increase funding. It is most obvious for inpatient care. The average length of hospital stay for active duty personnel is two-and-a-half times that of their civilian counterparts. A good deal of this extended stay is convalescent care rather than the acute care offered exclusively in civilian hospitals. In some part this has been recognized in the budget justification based on the composite work unit. It values admissions at 10 units. An occupied bed day is only worth one unit. This implies that shorter stays in military hospitals are worth more per day than are extended stays. Consider the following example: for an admission followed by five days in the hospital, one could report 15 composite work units. However, for an admission followed by 25 days in the hospital, one could only report 35 composite work units. This implies that while the first five days in the hospital average 3 work units per day, the average value for a 25-day stay is only 1.4 composite work units. Of course, the marginal value to the hospital of an additional day is only one work unit. The above example uses typical length of stay for the civilian sector (five days), and for the active duty military population (25 days). It also implies that the relative prices established through the budget justification mechanism are 1 to 3; i.e., one day of care for somebody who stayed five days (acute care) is worth three days of care for somebody who has been in the hospital for 25 days (convalescent care). This price ratio relatively overvalues convalescent care. As a result, there is an incentive to provide lots of it. This is clearly evidenced in both the statistical data and from site visits to several of the medical regional centers. Our cost calculations have corrected for this problem by crediting each medical activity with only the amount that providers in a civilian sector would charge for this same type of care. However, we have not taken into account the most serious costs to the Navy—the increase in "down" time for the active duty population. Of course the man-strength of the force could be reduced if the number of those in a patient status were diminished.

It should be recognized that these costing problems will continue to exist as long as BuMed is budgeted military billets rather than dollars to pay the full cost of military manpower; capital is budgeted separately from the operating budget and not amortized over its useful life; and budget justification is based on the amount of work activity reported. The intermediate goods must be allocated to the final measures of output. Capital must be cost justified, and it will be only if annually costed against the measures of output. Finally, the budgeting process has inherent incentives whose impact cannot be neglected. The incentives should be structured so that they supplement management control.

The model demands answers to several questions. The first of these was to specify the inputs and the outputs and their prices so that the model could be formalized. It asked what is Q, the output measure; X, the matrix of resource inputs; and P, the vector of prices? These problems have been addressed in Chapter 3. The production function was given less consideration. We have not attempted to describe the production processes nor to contemplate the substitution of capital and labor or substitution among the various skill levels of labor that are available. Only passing observations have been made of its technical efficiency. However, we did consider its economic efficiency in considering how the providers' incentives affect what is produced and at what volume. This has been briefly discussed above in relation to the bias of the output measures. The conclusion reached there was that those services that are relatively overpriced are in excess supply. More broadly, the incentive to justify budgets, staffing levels, and capital acquisition produces more of practically every service than what is provided in the civilian sector either under the fee-for-service arrangement or the prepaid group plans.

Additionally, explicit consideration must be made of the first-order marginal conditions, that is, of the tradeoffs between the cost of producing the product and the value that is attached to it. Because the consumers of medical care are not paying its cost, we cannot assume that the system will approach the equilibrium conditions. The quantity of medical services that is being provided is sufficiently large such that the consumers value its benefits at less than what it costs the Navy. This is evident in the high rates of utilization of outpatient services by the beneficiaries, studies of the impact of co-insurance on civilian populations, and by the excessive number of "sniffle" complaints that many of the young professional staff complained of during our site visits. An additional symptom of this was the high proportion of elective surgery that is occurring at some military hospitals. Basically, the effective demand for medical care in the Navy beneficiary population is high due to the zero price and the low opportunity cost of time facing the consumers, and the budgetary incentives facing the providers.

Our cost findings may be summarized simply: within the error of our estimates, military medicine is as expensive as that provided in the civilian sector under CHAMPUS. The government could save significant amounts of money, however, if their retired personnel and their dependents as well as dependents of deceased personnel, were denied access to military health care. This saving would result from the cost-sharing arrangements of CHAMPUS and from the change in utilization rate that would occur when these consumers were faced with a positive price. Similar results could be accomplished within the military health care delivery system if utilization of outpatient facilities could be curtailed by charging a co-payment. The magnitude of the estimates of the potential cost savings with these policies are included in the conclusions of Chapter 5.

Extremely high rates of utilization of both inpatient and outpatient services are also being reported for the active duty population. This is more difficult to evaluate because of mission constraints. However, it appears that there could be a substantial reduction if chit signing were reduced, the amount of sick leave were limited, and if either the serviceman or the line command were required to pay some portion of the marginal cost of providing these health care services. Currently there are neither controls nor incentives to reduce this effective demand.

BuMed has attempted to satisfy the demands of the line command, the active duty population, and civilian beneficiaries. They have done so using similar amounts of resources as would be used in the civilian sector, and have incurred approximately the same costs. The demands that they have been required to satisfy have been excessive because the consumers of military medicine have faced a zero price. The providers have not sought to effectively reduce this utilization due to the funding arrangements. But if costs are to be controlled, so must the utilization. Efficiency considerations are of secondary importance.

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